Five-Year Review Report

Second Five-Year Review Report

for Southeast Rockford Groundwater Contamination Site

Rockford, Illinois

May, 2003

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Date:

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Five-Year Review Report

Table of Contents

Insert (Community Notification - after p.19)

Figures

List of Acronyms

AOC Administrative Order on Consent
ARAR Applicable or Relevant and Appropriate Requirement
CD Consent Decree
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
DCA 1,1-Dichloroethane
DCE 1,1-Dichloroethene
EPA United States Environmental Protection Agency
CFR Code of Federal Regulations
MCL Maximum Contaminant Level
NCP National Contingency Plan
NPL National Priorities List
O&M Operation and Maintenance
PRP Potentially Responsible Party
RA Remedial Action
RAO Remedial Action Objective
RD Remedial Design
RI/FS Remedial Investigation/Feasibility Study
ROD Record of Decision
SDWA Safe Drinking Water Act
SERGWC Southeast Rockford Groundwater Contamination Site
TCA 1,1,1-Trichloroethane
TCE Trichloroethene
USGS United States Geological Survey
VC Vinyl Chloride
VOC Volatile Organic Compound

Executive Summary

The United States Environmental Protection Agency (U.S. EPA), Region 5, conducted the five-year review of the remedy being implemented at the Southeast Rockford Groundwater Contamination (SERGWC) Superfund Site in Rockford, Illinois. This is the second five-year review for the SERGWC Site. The first Five Year Review, performed in 1998, noted the municipal water supply hookups that had occurred as called for in Records of Decision (ROD) for Operable Unit #1 and #2. The first Five Year Review certified that the elimination of threats pertaining to groundwater exposure through such municipal hookups indicated that remedies selected in earlier Operable Units remained protective of human health and the environment.

With the passage of five years since the first such review, a second Five Year Review is now required. This second review will examine significant site developments over the past five years, including development and initial results of a groundwater monitoring network established with the City of Rockford via Consent Decree, source control remedy selection and initiation of source control remedial design, and a look at possible pathways related to groundwater contaminants which do not necessarily involve groundwater consumption.

The occurrence of volatile organic compounds (VOC) was detected in certain Rockford Water Utility wells as early as 1981. During 1982, several City of Rockford municipal supply wells were shut down if found to be contaminated. In investigating this matter further, the Illinois Environmental Protection Agency (Illinois EPA) noted a wider spread residential well contamination problem by 1984. Initial leading contaminants of concern included 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene. Other contaminants were subsequently found, such as 1,2-dichloroethane. Illinois EPA undertook a major sampling effort from 1985-1989, involving some 337 residential well samples, to better define the problem.

As a result of these sampling efforts, in 1988 the SERGWC site was proposed for inclusion on the National Priorities List (NPL). In March 1989, the SERGWC was officially added to the NPL.

While the site has largely been handled as State lead facility, with federal support coming in the means of cooperative agreements, in August 1989 U.S. EPA initiated a time critical removal action via which bottled water was offered as a temporary measure to residents whose wells exceeded contamination levels at 25% or more of the Removal Action Levels established for various VOC contaminants.

In March 1991 a Proposed Plan for the first Operable Unit was released to the public. The plan suggested connection of those residences with contaminated wells to an extended municipal supply of clean water, plus installation of a granular activated carbon unit to Municipal Well # 35, which had showed signs of contamination. A ROD was signed in June 1991 calling for adoption of these measures.

By November 1991, some 264 homes had been connected to the utility system. Also during 1991, remedial investigation was begun to better define the extent of the plume of contamination within the local aquifer. Plume depictions will be noted elsewhere in this document.

During 1992 and 1993, geophysical surveys were done, which helped examine possible leading sources of the contamination. Concepts of breaking up the site into related subareas associated with potential major source areas began to take shape. Reports of illegal dumping that may have contributed to the plume's existence were examined. Soil gas and residential air sampling were also performed.

By 1995, results of this additional sampling had been assimilated, and following public comment evaluation a second ROD was signed on September 29, 1995. Operable Unit Two (OU #2) called for further extension of City of Rockford municipal water supply, such that an additional 400 homes and businesses in close proximity to where the groundwater plume of contamination was being tracked could be hooked up. Additionally, after examining various forms of aquifer remediation, OU #2 selected natural attenuation as means of restoring the contaminated aquifer so as to meet appropriate state and federal groundwater cleanup goals. Monitoring of the aquifer over time was also a remedy component. Projected restoration time frame is lengthy; on the order of 200 years if certain source control measures were adopted and executed. However, more active pump and treat measures were estimated to take nearly a century as well to bring about aquifer restoration.

A remedy performance consent decree to extend water mains and hook up more people was signed in 1998, with the City of Rockford agreeing to extend the water supply and perform the needed aquifer restoration monitoring. A cost recovery consent decree was also developed, whereby the federal and state agencies were able to recover the brunt of their expenditures through 1997, as well as have the settling parties establish a special account for future remediation dealing with Area 7, believed to be the largest of four major source areas contributing to aquifer contamination.

Following further remedial investigation and feasibility study, Illinois EPA held a public comment period from June-August 2001 to consider a proposed plan dealing with the four major areas believed to be the prime locations of additional sources either entering the plume of contaminated groundwater, or contributing to excessive contamination of nearby soil/vadose zones. By June 2002, the Operable Unit #3 ROD had been signed by both Illinois EPA and U.S. EPA. The four major source areas (Area 4, Area 7, Area 9/10, and Area 11) were divided into soil and leachate control zones, with remedies developed for each portion. Soil remedies consisted of either low temperature thermal desorption or soil vapor extraction measures. Leachate remedy consists of the establishment of groundwater management zones, monitoring, and either limited extraction pumping so as to achieve local containment, plus treatment of collected water, or air sparging or other related enhancement which would supplement soil vapor extraction measures. In the case of Area 9/10, the need to invoke limited pumping and treatment related to deeper aquifer control is contingent upon relative success of soil remedy steps.

With the execution of cooperative agreement documents in late September 2002, Operable Unit #3 entered the remedial design phase. On January 13, 2003, the Region 5 Superfund Division Director signed an Administrative Order on Consent (AOC), also signed by Hamilton Sundstrand, which calls for conduct of remedial design at Area 9/10 to attain ROD objectives.

With the establishment of additional monitoring wells by the City of Rockford in late 1998 and early 1999, the City has been sending in over the past 3-4 years results of sample collection at these wells. No significant trend is evident thus far in the groundwater monitoring data. This is to be expected, since the remedial action measures contemplated for Area 4, 7, 9/10, and 11 have not had opportunity to be instituted as yet. More meaningful groundwater quality trends may start to emerge in another 5-10 years, once source control measures are on line.

There has been considerable new information, developments, and guidance appearing lately concerning the possible vapor intrusion question. Although Illinois EPA collected over 20 residential air samples near Areas 4 and 7 some years ago, it is appropriate to revisit this issue. As this Five Year Review Report is being compiled, Illinois EPA has developed a work plan which will guide efforts to summarize existing information, screen environmental setting and household information to yield locations which might be best suited to gather further soil, soil gas, residential air information, etc., and then to act appropriately on any significant new findings. Sample results are not available at this time, but are expected before the end of 2003. When findings and conclusions of this sampling effort are available, U.S. EPA will work with Illinois EPA and if necessary, will amend the issues of note and subsequent recommendations and followup actions discussed within this Five Year Review Report as appropriate.

The remedy implemented at OU #1 and OU #2 is protective of Human Health and the Environment, all immediate health threats have been addressed, and there are no exposures of concern. For Operable Units 1 and 2, which dealt with both extension of clean municipal water supply, and the opportunity to hook-up residences and businesses that previously may have been using a contaminated private water source, and with developing a remedy to attain eventual aquifer cleanup, remedial actions either have been taken or are on-going. The remedy is protective given completion of a portion of the remedy (i.e., hook-up of several hundred users to a clean, alternative water supply), and appears to be protective of human health and the environment for that portion of the remedy for which remedial action is underway. That is, for the process of aquifer cleansing through natural attenuation, monitoring results indicate the presence of more complex contaminant breakdown, or intermediate, products.

For Operable Unit 3, the remedy is expected to be protective upon completion. For the more concentrated source areas for which soil cleansing and/or groundwater management zone action is needed, action stands at the remedial design process. The technologies selected for Operable Unit 3 appear to be protective of human health and the environment since they largely represent technologies which constitute presumptive remedies in dealing with volatile organic contaminants in soils and groundwater. Once design is complete, and the remedial technologies are installed and operating, a following review report can deal more definitively with the degree of success of the source control efforts.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name ***(from WasteLAN)***: Southeast Rockford Groundwater Contamination Site

EPA ID ***(from WasteLAN)***: ILD981000417

Region: 5	**State:** Illinois	**City/County:** Rockford/Winnebago

SITE STATUS

NPL status: Final x Deleted ☐ Other (specify) _____

Remediation status (choose all that apply): XX Under Construction xx Operating ☐ Complete

Multiple OUs? xx☐ YES NO	**Construction completion date:** ___ / ___ / _____

Has site been put into reuse? X☐ YES ☐ NO (portions)

REVIEW STATUS

Lead agency: x EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Russell D. Hart

Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5

Review period: _10_ / _25_ / _2002_____ to _5_ / _11__ / _2003_____

Date(s) of site inspection: __4_ / 22-24_ / _2003_____

Type of review:

X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review number: 1 (first) xx☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
Construction Completion (PCOR) XX☐ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date ***(from WasteLAN)***: __1_ / __15_ / _1998_____

Due date ***(five years after triggering action date)***: _1__ / _15__ / _2003_____

["OU" refers to operable unit.]

Five-Year Review Summary Form, cont'd.

Issues: Despite many outreach attempts by the City of Rockford, Illinois EPA and U.S. EPA, between 5-10 residences elected not to hook-up to clean municipal water supplies. It may be appropriate to revisit such decisions with appropriate Rockford and/or Winnebago County officials should such unconnected properties come up for sale/change ownership in the future. While mid 1990s sampling indicated the vapor intrusion pathway was not a health problem at this site, Illinois EPA is revisiting this subject using more recent guidance materials. The agencies will observe groundwater monitoring wells at various depths in the proximity of the Rock River to help determine whether any movement of groundwater into the Rock River may be a cause for concern. As remedial design efforts develop, the agencies will look for indications of possible NAPLs presence, and if revealed, how might this matter be best managed. Early 1990s USGS work provided a reassuring observation that municipal water supply pumping in the deeper sandstone aquifer was not drawing in contaminants from the overlying dolomite (and above it the unconsolidated deposits aquifer) portions. It may be prudent to continue to make further observations on this subject to determine if this is still the case.

Recommendations and Follow-up Actions: 1. Consider applicability of local code and/or zoning ordinances at times of property ownership changes in those relatively very few properties which elected not to hook-up to clean municipal water supply. 2. Track information developed for Area 9/10 to see if it ever becomes necessary to invoke OU #3 contingency dealing with deeper aquifer zones or detected zones of non aqueous phase liquids. 3. Monitor well information which would provide information on the question of plume underflow or entry into the Rock River and effects thereof. 4. Work with Illinois EPA in considering further information gathered about the question of vapor intrusion around certain residential zones near source areas such as Area 4 and Area 7. Should any further supplemental remedial action be warranted based on such additional information, take such action based on the facts of the matter. 5. Consider how the overall site aquifer, both shallower and deeper zones, is observed to respond once source area remedial actions are begun. 6. Exhibit sufficient flexibility in the possible modification of existing quality assurance and sampling documents based on long-term future analytical techniques, future new sampling hardware, etc. 7. Consider new research and continuing developments that could periodically call into question not necessarily the protectiveness of original remedies selected, but the advisability of continuing such remedy without alteration.

Protectiveness Statement(s): The remedy implemented at OU #1 and OU #2 is protective of Human Health and the Environment, all immediate health threats have been addressed, and there are no exposures of concern. For Operable Units 1 and 2, which dealt with both extension of clean municipal supply, and the opportunity to hook-up residences and businesses that previously may have been using a contaminated private water source, and with developing a remedy to attain eventual aquifer cleanup, remedial actions have been taken or are on-going. The remedy is protective given completion of a portion of the remedy (i.e., hook-up of several hundred users to a clean, alternative water supply), and appears to be protective of human health and the environment for that portion of the remedy for which remedial action is underway. That is, for the process of aquifer cleansing through natural attenuation, monitoring results indicate the presence of more complex contaminant breakdown, or intermediate, products.

For Operable Unit 3, the remedy is expected to be protective upon completion. For the more concentrated source areas for which soil cleansing and/or groundwater management zone action is needed, action stands at the remedial design process. The technologies selected for Operable Unit 3 appear to be protective of human health and the environment since they largely represent technologies which constitute presumptive remedies in dealing with volatile organic contaminants in soils and groundwater. Once design is complete, and the remedial technologies are installed and operating, a subsequent review report can deal more definitively with the degree of success of the source control efforts.

Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with Section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above such levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (U.S. EPA), Region 5, conducted the five-year review of the remedy implemented at the Southeast Rockford Groundwater Contamination Superfund Site in Rockford, Illinois. This review was conducted by the Remedial Project Manager (RPM) for the entire site from October 2002 through May 2003. This report documents the results of the review.

This is the second five-year review for the SERGWC Site. The triggering action for this policy review was the preparation of the first five-year review report in 1998. The first report discussed progress concerning the municipal water supply hookups that had occurred as called for in Records of Decision (ROD) for Operable Units #1 and #2. The first Five Year Review certified that the elimination of threats pertaining to groundwater exposure through such municipal hookups indicated that remedies selected in earlier Operable Units remained protective of human health and the environment. A second Five Year Review is now required. This second review will examine significant site developments over the past five years, including development and

initial results of a groundwater monitoring network established with the City of Rockford via Consent Decree, source control remedy selection and initiation of source control remedial design, and a look at possible pathways related to groundwater contaminants which do not necessarily involve groundwater consumption. Aside from the five year passage of time since the first Five Year Review Report, it is also appropriate to conduct review since a portion of the site remedy consists of natural attenuation, as noted within the ROD for OU #2. While OU #2 established a goal of aquifer restoration to appropriate state and federal requirements, natural attenuation will not achieve such remedial goals within a five-year time frame.

As of the present time, hazardous substances remain on the SERGWC site which preclude unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Area manufacturing operations begin.	**Early 20th Century**
First reports of VOC contamination in Rockford Water Utility system wells	**1981**
Contaminated municipal wells shut down	**1982**
Private residential well sampling	**1984-1989**
NPL inclusion proposal	**June 1988**
NPL finalization	**March 1989**
Initial removal action - bottled water distributed under time critical removal action Subsequent removal actions - carbon filters at water tap and first alternate supply hookups	**August 1989** **Removal action memo signed 10/25/1989; removal action completed 12/01/1990**
OU #1 RI/FS and Proposed Plan developed - OU #1 - calls for additional resident hook-up to municipal water supply	**March 1991**
OU #1 ROD.	**June 1991**

Table 1: Chronology of Site Events

Event	Date
264 residences hooked up to municipal supply	**November 1991**
Phase I/II remedial investigation; further plume definition	**1992-1994**
OU #2 ROD - Additional 400 home/business hook-ups, plus aquifer natural attenuation	**September 1995**
Consent Decree - City of Rockford extends water mains, establishes groundwater monitoring network, and reports on aquifer natural attenuation response	**1998**
Consent Decree - Various private firms provide cost recovery to federal/state agencies and establish Area 7 special account fund	**1998**
Further source area investigation	**1996-2000**
Proposed Plan - Source Areas OU #3 ROD signed	**Comment Period June - August 2001; ROD signed June 2002**
RD cooperative agreement start Area 9/10 RD Negotiation Conclusion; PRP RD Start Five Year Review Site Inspection OU #3 RA Construction	**September 2002** **January 2003** **April 2003** **Projected for 2004-2005**

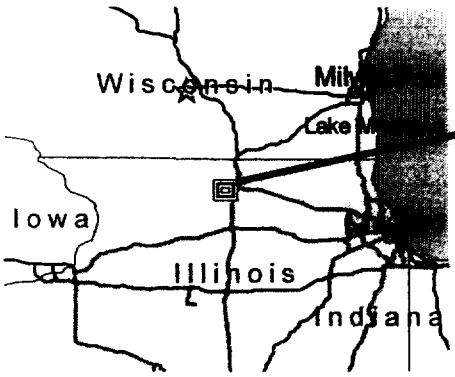
III. Background

Physical Characteristics

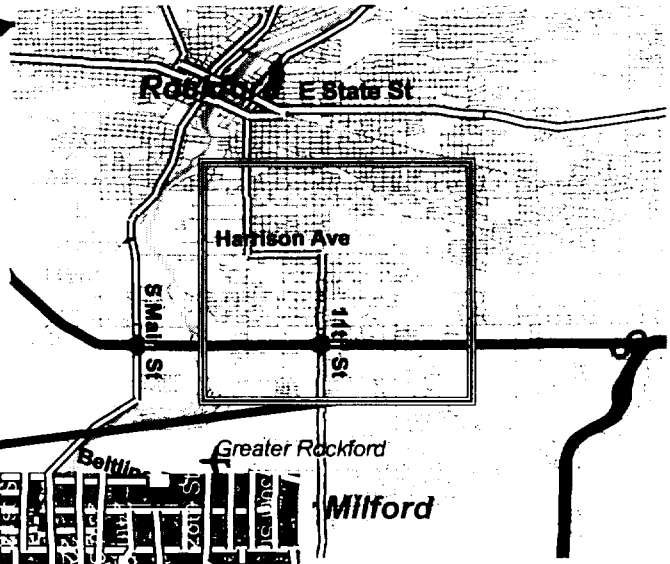
The Southeast Rockford Groundwater Contamination Site (SERGWC), see Figures 1 and 2, as originally proposed for the National Priorities List in June of 1988, was an area encompassing about 0.7 square miles in Rockford, Illinois. The 0.7 square mile area included residential and commercial properties. Presently, land use within the original site boundaries continues to be residential and commercial. The original boundaries of the site included an area of private wells

Southeast Rockford Superfund Site

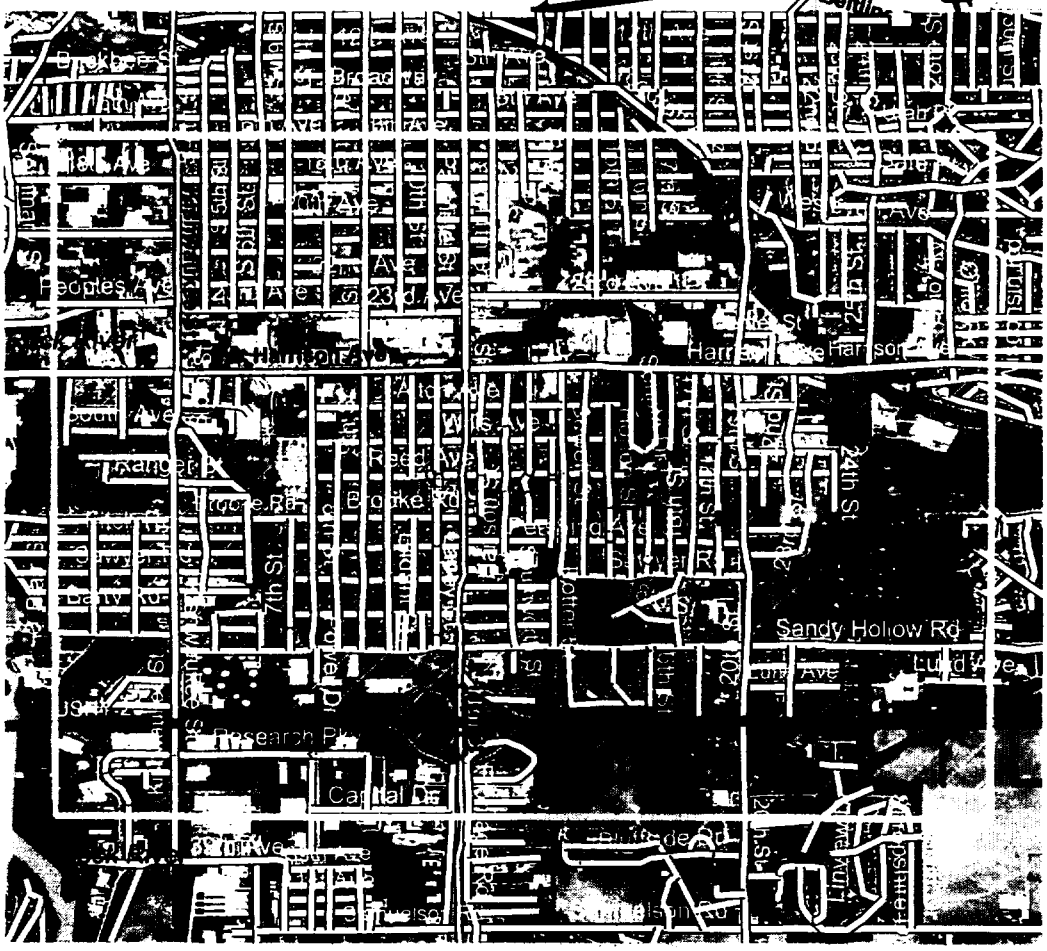
1) State



2) Winnebago County



3) Southeast Rockford Site

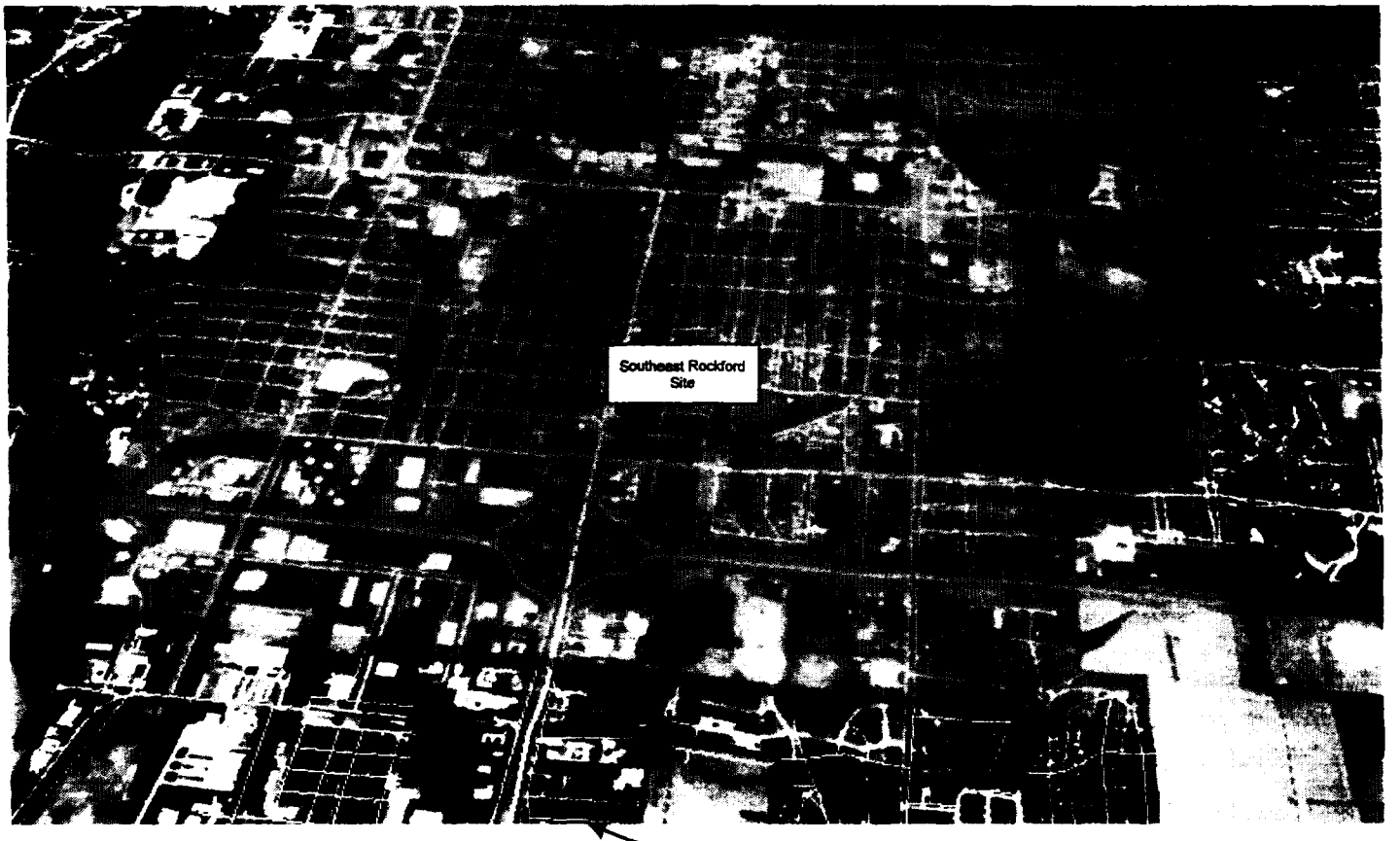


EPA Region 5

Plot created by David Wilson U.S. EPA Region 4/15/2003

Figure 1

Southeast Rockford Site
3D Surface Terrain Model



Elevation

- 867 - 891
- 844 - 867
- 820 - 844
- 797 - 820
- 773 - 797
- 750 - 773
- 726 - 750
- 703 - 726
- 680 - 703

Figure 2

EPA

Region 5

Plot created by David Wilson U.S. EPA Region 5 on 5/18/2003
B&W Image Date 7/1/1981

bounded by Harrison Avenue to the north, Sawyer Road to the south, Twenty-First Street to the east and Eighth Street to the west. Following development of the1991 ROD for OU #1, additional geohydrology and groundwater quality contamination study, aided in part by efforts of the U.S. Geological Survey, caused an expansion of the site to a much larger area. This "Phase I" study, as it came to be known, is described in more detail in the OU #2 ROD, developed in 1995. The current boundaries of the site are defined by the extent of groundwater contamination with concentrations of total volatile organic compounds (VOCs) above 10 parts per billion (ppb) or micrograms per liter. Figure 3 identifies the site and its approximate boundaries.

Land and Resource Use

It may be appropriate to consider the site in two processes: one, the overall plume of groundwater contamination as denoted by the 10 ppb contour line as depicted within Figure 3 , and two, the leading subsets of continuing sources of contaminants as discussed later and described for Areas 4, 7, 9/10, and 11. For the plume as a whole, land usage ranges from residential to commercial to highly industrialized. Each of the major source Areas has somewhat unique characteristics as will be described more fully below.

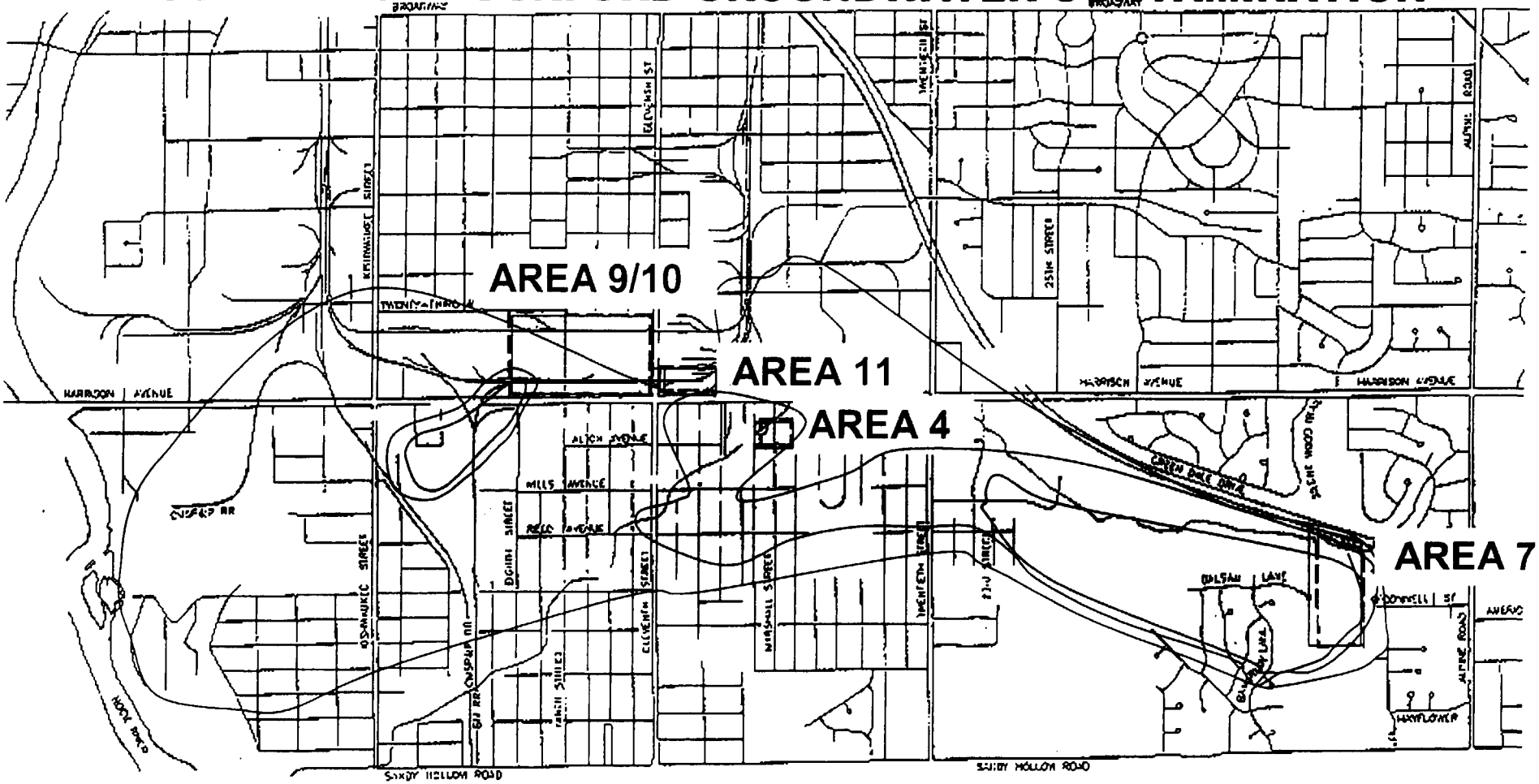
Topography in the Rockford area consists of rolling hills with elevations of around 850' above mean sea level, to the Rock River which has an elevation of about 700' above mean sea level, as it flows along the western edge of the site, generally in a north to south direction.

The geology of the SERGWC site consists largely of unconsolidated glacial sediments deposited unconformably in a buried bedrock valley consisting of fractured dolomite. The dolomite in turn overlies the Glenwood sandstone. The unconsolidated deposits consist mostly of sand and gravel outwash deposits with occasional discontinuous silt, clay and interbedded till deposits. Portions of the buried bedrock valley reach depths of over 200 feet below surface grade. There are numerous buried bedrock valleys in the area, and existing creeks and river valleys tend to follow the buried bedrock valleys.

There does not appear to be any significant laterally continuous aquitard through the site. Hence, groundwater in the unconsolidated deposits is unconfined and in contact with bedrock aquifers. In the site area, depth to groundwater is generally around 30-40'. Site groundwater flow usually has a western flow component towards the Rock River; across the eastern half of the site flow in the unconsolidated aquifer is generally from the southeast to the northwest. As one moves west across the site, unconsolidated aquifer flow continues west, but with more of a southwesterly flow component.

In compiling the results of the U.S. Geological Survey effort, as presented in their 1994 report, USGS observed that the degree of vertical fracture interconnection in the dolomite tends to increase with depth. In comparing ground water levels with deeper municipal well pumping patterns, USGS noted that the effects of municipal pumping in the deeper sandstone aquifer did

SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION



AREA of CONCERN

Total Chlorinated VOCs > 10 ppb

Total Chlorinated VOCs > 100 ppb

Total Chlorinated VOCs > 1000 ppb

Figure 3 - Site Areas of Concern/ approx. 10 ppb plume contour

not extend into the lower part of the dolomite aquifer (located some 2700' from the pumped well). USGS observed that this suggests that pumping in the deeper municipal wells was not promoting migration of the VOC contaminants from the dolomite aquifer to the underlying sandstone aquifer.

Contamination History

Although VOCs were initially detected in several municipal wells owned by the City of Rockford in 1981, the Illinois EPA became aware of a VOC problem in residential wells in 1984 after investigating reports that plating wastes had been illegally disposed of in a private well. In October 1984, the Illinois Department of Public Health (IDPH) initiated a study that involved the sampling of 49 private wells in the vicinity of this well. Significant levels of contaminants associated with plating wastes were not found in the study, but high levels of chlorinated solvents were found in many of these private wells. The solvents found in the private wells included trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA). Illinois Department of Public Health took an additional 337 water samples from residential wells between 1985 and 1989 to determine how many residential wells were affected by groundwater contamination. The Illinois State Water Survey also performed a regional groundwater investigation between 1986 and 1988. This investigation also verified widespread residential and municipal well contamination. Several municipal wells owned by the City of Rockford were closed as a result of groundwater contamination in southeast Rockford.

Initial Response/Removal Action

As a result of the widespread groundwater contamination within southeast Rockford, the site was proposed for inclusion on the National Priorities List (NPL or "Superfund List") on June 24, 1988 and was formally added to the NPL on March 31, 1989 as a state-lead, federally funded Superfund Site (United States 1988, 1989). In August 1989, U.S. EPA sampled 112 residences around the site to determine if an immediate removal action was warranted. Later in 1989, U.S. EPA initiated a time critical removal action in which residents whose water well analyses revealed VOC levels greater than or equal to 25% of the Removal Action Level were provided with bottled water as a temporary measure. The same residents received point-of-use carbon filters in December 1989 as another intermediate measure. The U.S. EPA ultimately extended water mains and provided service connections to city water for 283 residences as a time critical removal action. This action was completed in late 1991.

Basis for Taking Action

The basis for taking action at the SERGWC site has evolved with site needs. Immediate needs concerned first findings of relatively high levels of actual contaminant ingestion through private

well drinking water supply usage. This is expressed in the first removal action. Next, the need arose for more systematic extension of clean municipal water supply. Remedial action Operable Unit #1 served this purpose. This evolved into further definition of the overall plume, what more predictable contour lines might trigger further action, and the establishment of aquifer restoration goals. This was the eventual focus of remedial actions for Operable Unit #2. How to manage the difficulty in attaining the aquifer restoration goals then became the focus of Operable Unit #3, dealing mainly with source control around certain areas that could continue to release significant amounts of contaminants into the aquifer if left unchecked.

Parenthetically, it can be observed that in an ideal situation it might be better to deal with source areas first, and then move into groundwater management once sources are addressed. At the SERGWC site, historically the more pressing need was to deal with an objectionable groundwater ingestion pathway first, and then with this more pressing need addressed, move on to the goals of aquifer restoration and source control.

IV. Remedial Actions

Remedy Selections/ Remedial Actions

Operable Unit One

Because of the size and complexity of the groundwater contamination in the area, the Illinois EPA and U.S. EPA planned and organized activities at the site as smaller, more manageable groupings of activities called operable units. The Illinois EPA and its consulting/engineering firm began work under the first operable unit (OU1 #1) with a remedial investigation. The primary focus of OU #1 was to address contamination in residential wells. An additional 117 private wells were sampled as a part of the OU #1 Remedial Investigation (RI). The objective of this sampling event was to determine how many homes had wells with levels of VOCs below the time critical removal action cutoff (discussed previously), but above Maximum Contaminant Levels (MCLs). Illinois EPA's sampling revealed that additional residences needed to be connected to the city's water supply system. A proposed plan for OU #1 was made public in March 1991. A Record of Decision (ROD) for OU #1 was signed on June 14, 1991. The ROD called for more residences to be hooked up to the municipal water supply system and for a temporary granular activated carbon (GAC) water treatment unit to be installed at one of Rockford's municipal wells. The municipal well had been closed in 1985 due to unsafe levels of VOCs. The GAC unit was installed to assure sufficient potable water capacity for residents added to the city's water distribution system. By November 1991, an additional 264 homes were connected to city water. Between the U.S. EPA's time critical removal action (described earlier) and Illinois EPA's OU #1, a total of 547 homes received service connections to the city's water

supply system. All 547 homes received hookups to city water by November 1991 and a Remedial Action Report was signed by U.S. EPA on December 21, 1992. The Remedial Action Report certified that the selected remedy for OU #1 was operational and functional.

Operable Unit Two

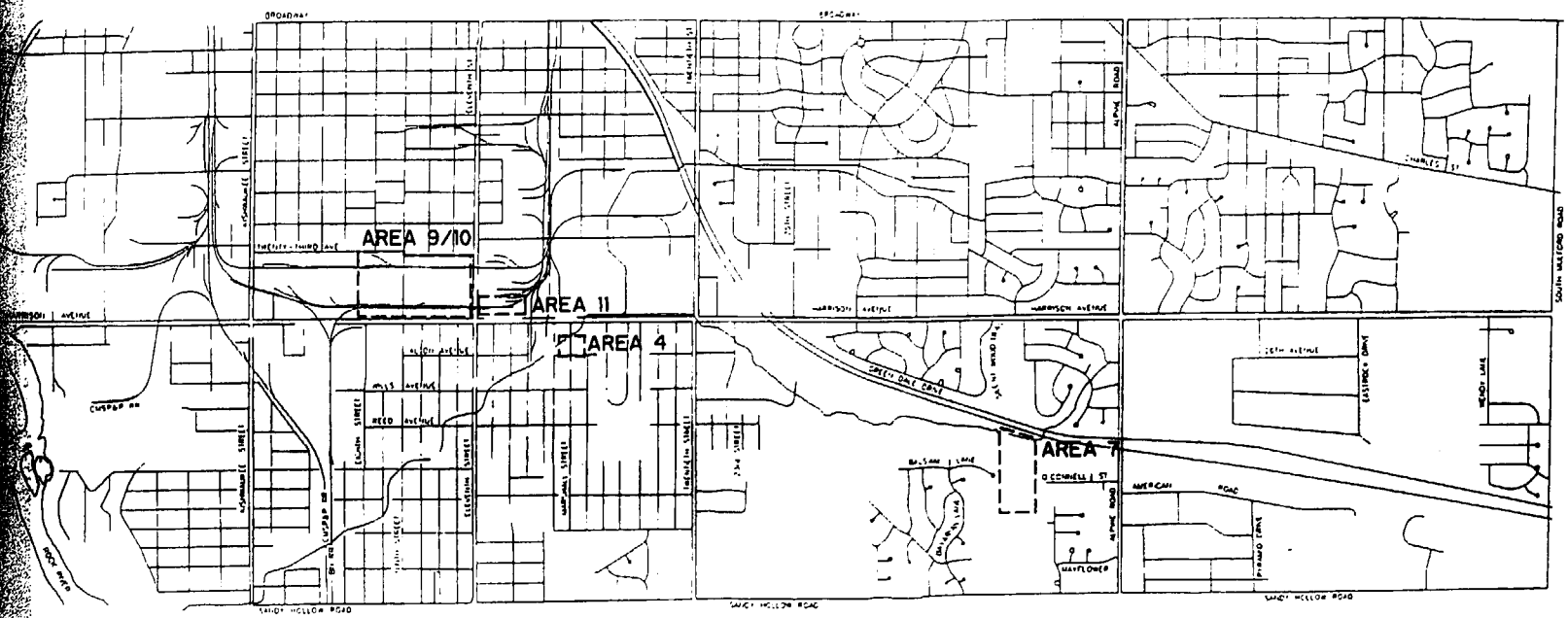
Further RI work for the second Operable Unit (OU #2) began in May, 1991 under the direction of the Illinois EPA. The objective of the OU #2 RI was to characterize the nature and extent of groundwater contamination throughout the site, as well as to provide information on "source areas" that were responsible for the contamination. The RI was conducted in two phases because of the size and complexity of the site. Phase I activities expanded the original NPL boundaries into a larger study area within Southeast Rockford. OU # 2, Phase I field activities included the following: 1) 225-point soil gas survey; 2) 33 monitoring wells were installed at 11 locations and sampled; 3) 19 Illinois State Water Survey Wells and 16 industrial wells were sampled. Fieldwork for Phase I was completed in October of 1991 and based on preliminary data, identified eight potential sources of groundwater contamination

Phase II field activities were conducted from January 1993 to January 1994. The following activities were conducted during the Phase II investigation: 1) 212 soil gas points were sampled; 2) 44 monitoring wells were installed and 165 groundwater samples were obtained; 3) 55 soil borings were conducted and 126 soil samples were obtained; 4) 24 groundwater samples were obtained from residential wells; 5) 20 residential air samples were taken; and 6) two test pits were excavated in the study area. USGS study results were also considered in compiling this phase of the RI.

Although several other groundwater plumes of contamination were identified, the Phase II investigation concluded that there were four primary source areas that were impacting the major plume that constitutes the site. The four primary source areas, Area 4, Area 7, Area 9/10, and Area 11 are identified on Figure 4.

Phase II activities also included groundwater modeling. The modeling was intended to be used as a tool in predicting future contaminant concentrations within the plume and projecting general plume migration directions. The modeling indicated that contaminant levels for 1,1,1-TCA in the plume will remain at levels above its MCL of 200ppb for 205 years assuming that the four source areas are remediated.

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) conducted as a part of OU #2, Illinois EPA issued a Proposed Plan on OU #2 in July of 1995. The ROD for OU #2 was signed on September 29, 1995. The major components of the selected remedy included: municipal water hook-ups for homes and businesses projected to have combined concentrations



LEGEND:

AREA 4 [ ] SOURCE AREA

SCALE:
500 0 1000 Feet

N

SOUTHEAST ROCKFORD
SOURCE CONTROL OPERABLE UNIT
SOURCE AREA LOCATIONS

...neers, scientists,
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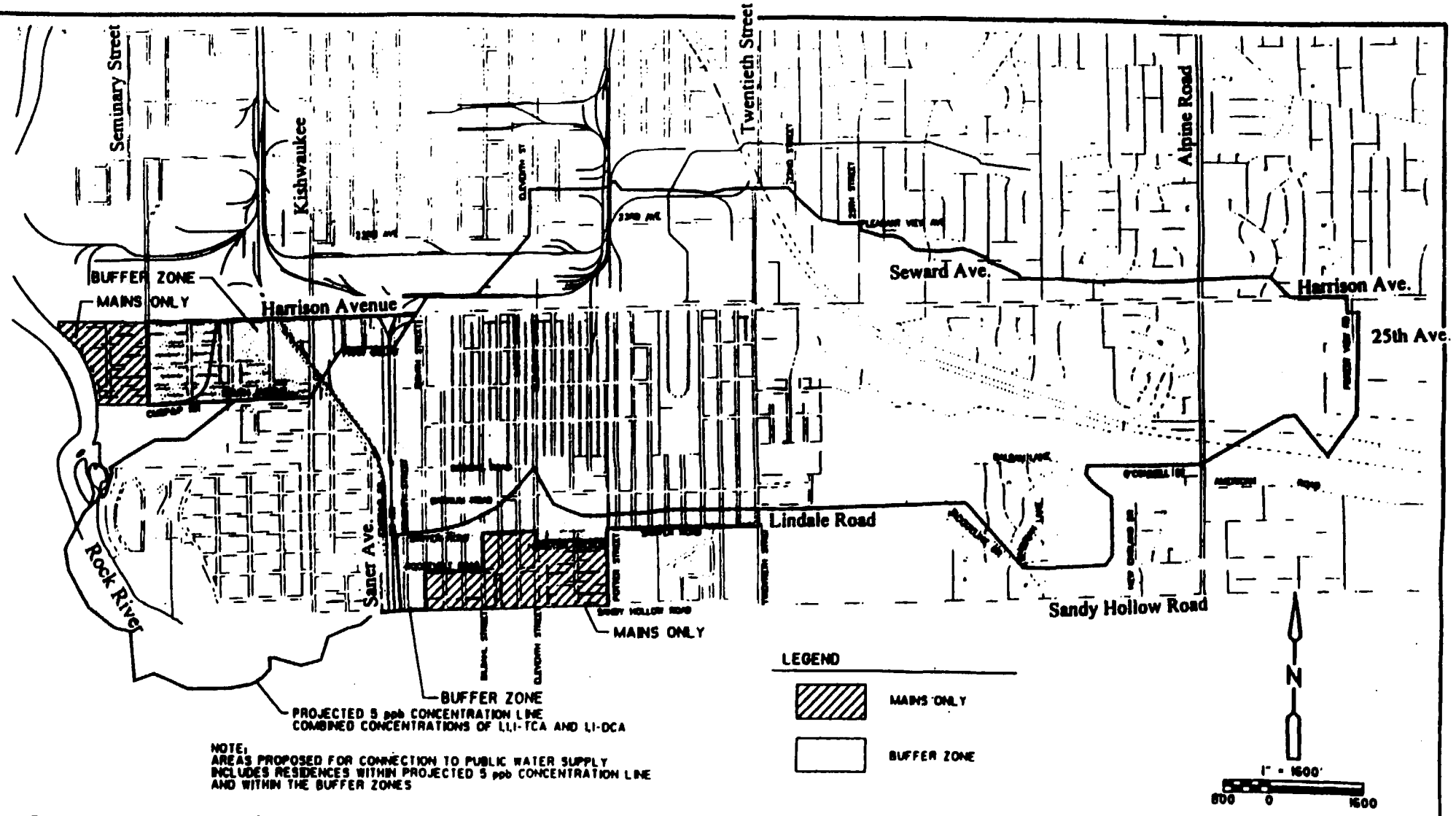
Figure 4 - Location of Four Primary Source Areas



State Route 20 runs E-W just to the south of the site.

Figure 5 - Water Main Extensions/ 5 ppb "Buffer Zone" Depiction

USE RESTRICTIONS

of 1,1,1-TCA and 1,1-Dichloroethane ("1,1-DCA") at levels of 5 ppb or greater (see Figure 5 for water main extension/ 5 ppb contour); groundwater monitoring for 205 years; and future source control measures at the four primary source areas, Area 4, Area 7, Area 9/10, and Area 11. Although source control was a component of the selected remedy within the OU #2 ROD, the ROD stated that the actual technology to be used for source control measures would be addressed within OU #3.

Management of Migration Response Objectives

For OU #2, certain management of migration response objectives were established. These included:

1. Eliminate or minimize the threat posed to human health and the environment by preventing exposure to groundwater contaminants;

2. Restore contaminated groundwater to Federal and State applicable or relevant and appropriate requirements (ARARs), including drinking water standards, and to a level that is protective of human health and the environment within a reasonable period of time; and

3. Control further migration of groundwater contamination beyond its current extent such that potential receptors are not unduly exposed to excessive contaminant levels

Major components of the ROD which deal with management of groundwater migration include:

1. Usage of natural processes to restore the groundwater to values as established by the ARARs throughout the aquifer. The primary attenuation process at the SERGWC site is expected to be intrinsic biodegradation.

2. Presumption that source control measures would be undertaken to reduce loadings to groundwater system, and reduce time required for achievement of goals

3. Forms of institutional control will continue to curtail land use and opportunity for drinking water well installation downgradient of the site. Supplementing such control is a local ordinance of which requires issuance of a groundwater well permit before installation of any new drinking water well in an area of environmental degradation.

4. Implementation of a long-term groundwater monitoring program designed to track horizontal and vertical extent of the contaminated groundwater plume boundaries, monitor changes in chemical constituents and concentrations, and collect data to confirm that intrinsic

biodegradation is occurring. Such monitoring program will consist of existing and new monitoring wells, and will attempt to examine any expansion of the plume toward new or existing water supply wells.

5. Activated carbon treatment at Municipal well MW # 35.

Operable Unit Three (Source Control Areas)

Discussion within the OU #2 ROD anticipated the need for further control of leading, continuing sources of additional contamination to the overall site aquifer. While supporting documents in the OU #2 administrative record projected that even without source control efforts the aquifer would eventually attain restoration goals through natural attenuation, this process would take over three hundred years to achieve without source control efforts. Performing effective source control at leading sources would reduce this time by over a hundred years, plus have the added benefit of fewer restrictions on surface/near surface soil usage as source control remediation took effect. Hence, a goal of the third site operable unit was to explore what were the leading source areas, examine types of contaminants, their concentration ranges, what problems were posed by such contaminants, and what remediation approaches might be able to deal with these contaminants in a cost-effective manner. While numerous additional source zones were considered, four areas of study were believed to comprise the major continuing source threats. These four major areas are discussed below, as well as the remediation technologies that were selected to deal with their soil surface/near surface and groundwater management zones. Figure 6 depicts Operable Unit Three source areas. OU #3 work is now in the design stage.

Area 4 - Description and Selected Source Control//Leachate Control Measures

Source Area Four (Area 4) is bounded by Harrison Avenue to the north, Alton Avenue to the south, and Marshall Street to the west. Barrett's Mobile Home Park is located just east of the area. Figure 7 identifies Area 4. The source of contamination is believed to be leaking underground storage tanks beneath the parking lot of Swebco Manufacturing, Inc located at 2630 Marshall Street. Swebco was a precision machining shop that produced metal parts. The property is approximately one acre in size and is currently zoned light industrial. Properties surrounding Area 4 include small businesses as well as single-family homes. The properties surrounding Area 4 are currently zoned either residential or light industrial.

Illinois EPA Bureau of Land files indicate that three underground storage tanks were used by Swebco at Area 4. The underground storage tanks are located beneath the parking lot at the facility and available information indicates and that they are likely to be empty. The past contents of the tanks have been reported to be fuel oil and waste oil. It is suspected that the waste oil may have contained 1,1,1-TCA, which as noted previously has historically been a leading contaminant of concern at the SERGWC site.

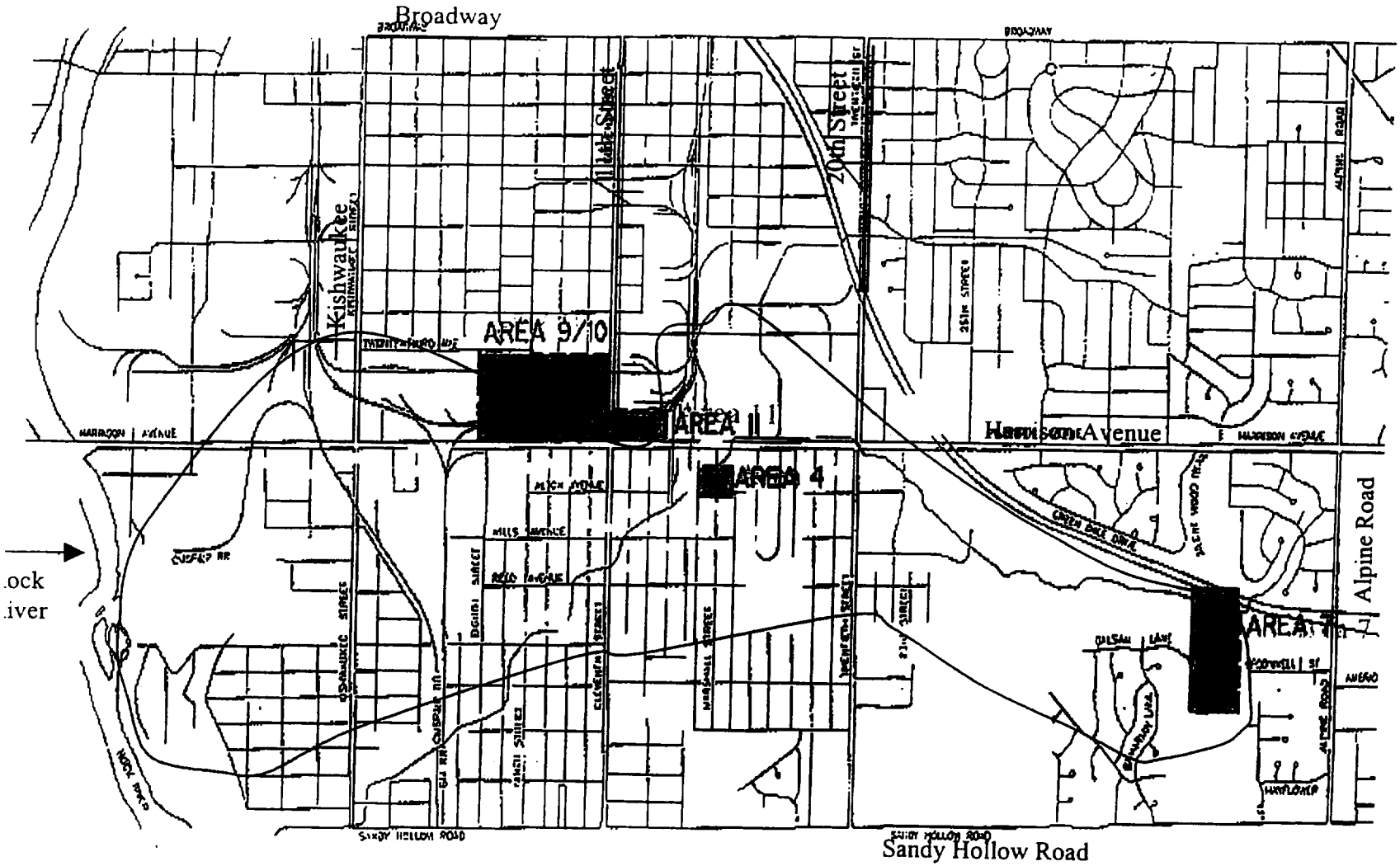
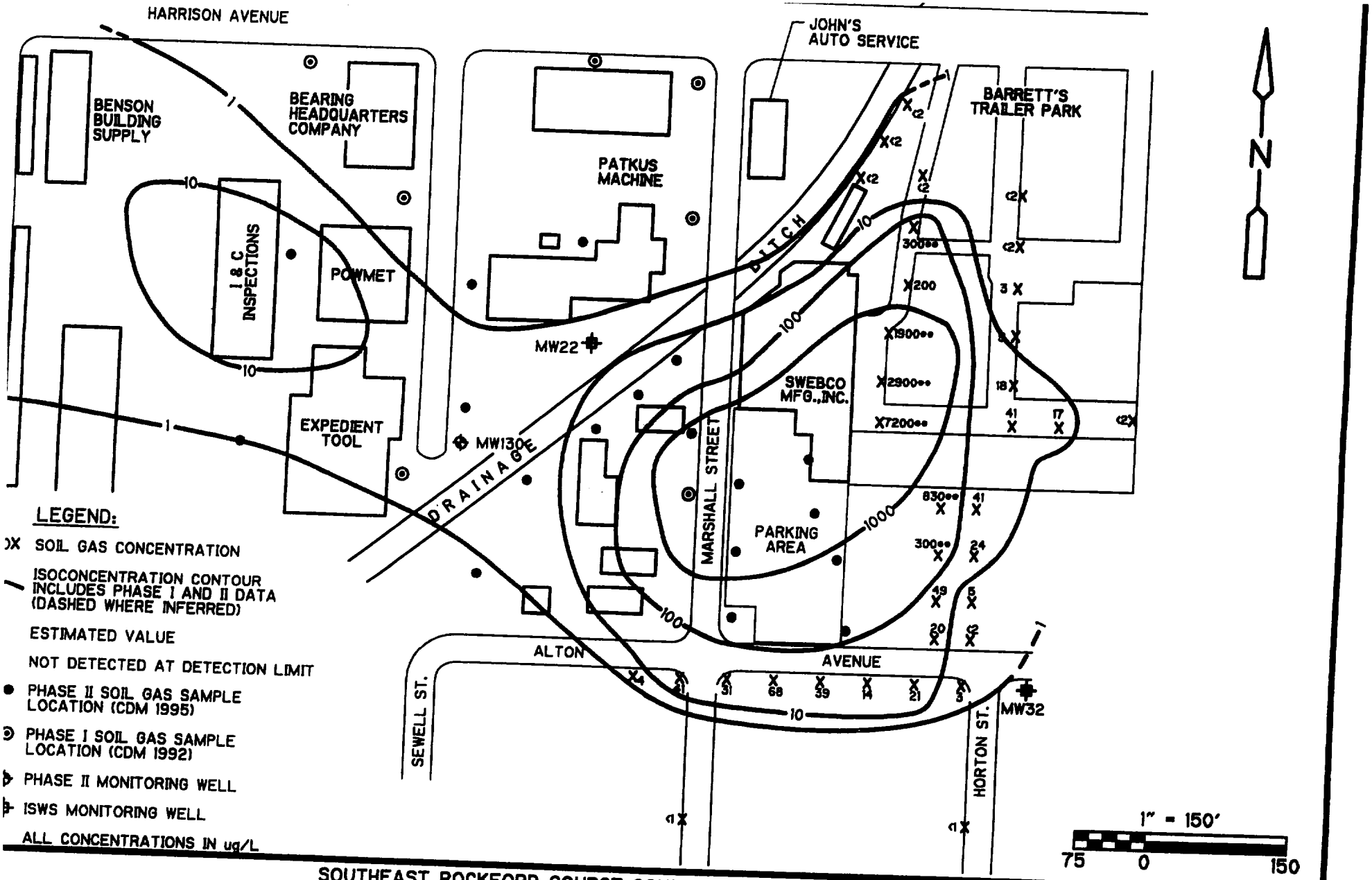


Figure 6 - Operable Unit Three Source Areas



SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT

AREA 4 SOIL GAS RESULTS FOR TCA

ineers, scientists, ement consultants

Figure 7 - Area 4

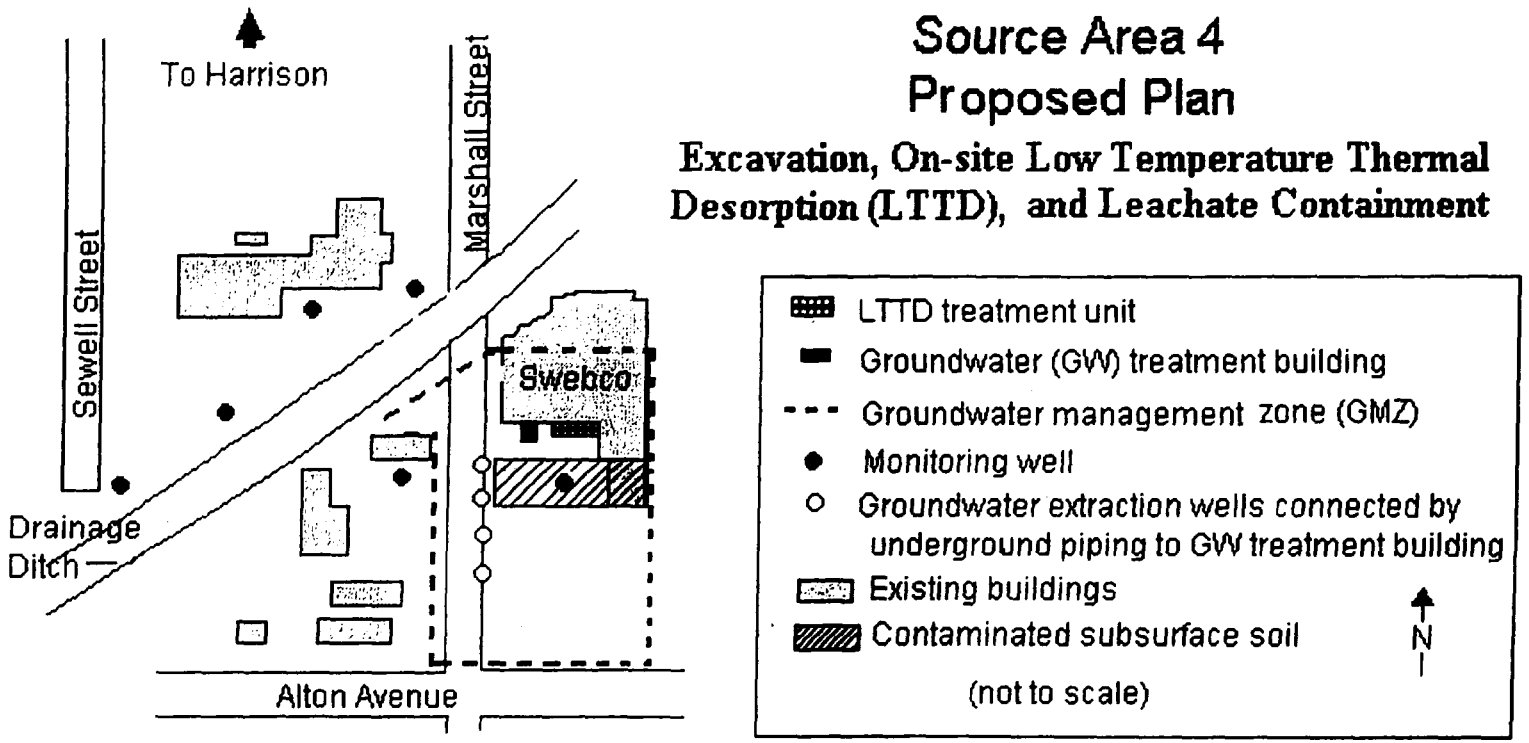


Figure 8 - Area 4 - Possible Layout - Source Remedial Components

In December of 1993, during Phase II of the OU #2 RI, high concentrations of 1,1,1-TCA were found in soils beneath a parking lot at the Swebco facility. Further investigation identified soil contamination at concentrations up to 510 parts per million (ppm) and appears to extend to a depth of 35 feet. The extent of contaminated soils is an area approximately 50 by 75 feet with the long axis oriented east-west. Assuming a thickness of 8 feet and an average 1,1,1-TCA soil concentration of 275ppm, the volume of highly contaminated soil was estimated at 1,100 yd3 with a weight of 1,1,1-TCA at 977 pounds. As 1,1,1-TCA from the contaminated soils are water soluble, contaminants from Area 4 are highly mobile in groundwater as evidenced by high levels of 1,1,1-TCA (1 ppm) in down gradient wells. The cause of contamination is believed to be a single source which consists mostly of 1,1,1 TCA.

The OU #3 ROD selected technologies to deal Area 4 contaminants found respectively in the vadose zone/soil source and leachate of groundwater management zone; see Figure 8 for a possible depiction of how remedial components could be deployed:

Soil excavation followed by on-site low temperature thermal desorption with afterburner for gaseous emission control
Cost estimates are: Capital/ $ 2,121,000; Annual O & M/ $ 1,000

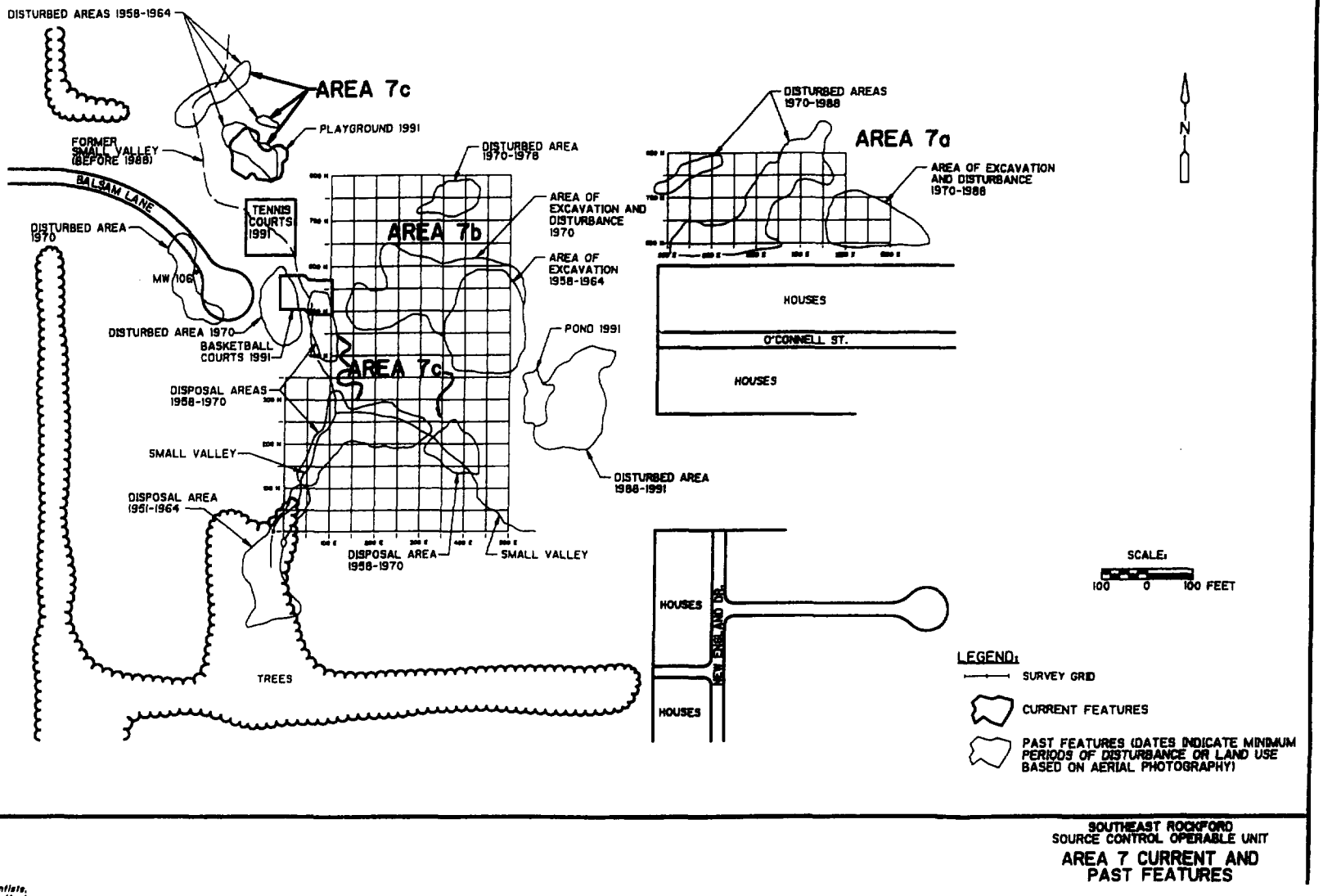
Considerable contamination may lie below the water table. Hence, the remedy would include wells for dewatering/lowering the water table. Such collected water would be put in storage tanks, and sent off-site for appropriate treatment. It is estimated that 2800 cubic yards of contaminated soil may need to be excavated and undergo thermal treatment.

Hydraulic containment with collection/treatment/monitoring.
Cost estimates are: Capital/ $ 249,000; Annual O & M/ $ 47,000

An estimated four pump and treat extraction wells, operating at a combined rate of approximately 20 gpm, with water collected cleansed of VOCs via an air stripper. Vapors leaving this unit to be treated by GAC or catalytic oxidation. Treated effluent would be sent to a nearby storm water ditch.

Area 7 - Description and Source Control//Leachate Control Measures

Source Area Seven (Area 7) is located in the most southeastern portion of the Southeast Rockford Superfund Site, northwest of the intersection of Alpine and Sandy Hollow Road. Specifically, Area 7 is located at the eastern end of Balsam Lane. Figure 9 shows Area 7 recent past and present land activity. The area contains Ekberg Park, a municipal park owned and maintained by the Rockford Park District. The park consists of open grassland, paved tennis and basketball courts, a children's playground, and a parking area. Area 7 also includes privately owned agricultural land and wooded areas to the south and north of the park . Surface water drainage at Area 7 follows the area's topography which slopes downward from south to north.



SOUTHEAST ROCKFORD
SOURCE CONTROL OPERABLE UNIT
AREA 7 CURRENT AND PAST FEATURES

ental engineers, scientists, & management consultants

Figure 9 - Area 7 - Past/Present Area Activity/Location

Two small valleys merge at the base of the hillside on the south of the area and feed into an unnamed creek that boarders the north side of the site. Residential areas border the area to the east and west.

Elevated concentrations of VOCs in monitoring well number 106 (MW106) and aerial photographs showing ground surface excavations helped to identify Area 7 as an area of concern. Part of Area 7 was once a gravel pit as shown on historical maps compiled by the United States Geological Survey. Examination of aerial photographs since the 1950s identifies areas of excavation and disturbed ground east of the end of Balsam Lane. In addition, U.S. EPA has received reports of illegal dumping in the area in the past.

The geology at Area 7 consists of a heterogeneous combination of sands, silts, and clays that overlie dolomite bedrock. The heterogeneous nature of the geology at Area 7 correlates well with reports of past activities such as quarrying and land filling. Groundwater in both the surficial and bedrock aquifer flows in a northwest direction. Depth to groundwater ranges from 36 feet at MW135 located south of the park, to 13 feet in MW134 within the park, to less than 2 feet in MW105 near the creek.

Soil source/vadose zone and groundwater management/leachate zone portions of remediation technologies as selected within OU #3 for Area 7 include, respectively:

A combination of soil vapor extraction (SVE) and air sparging system; with vapors thus collected treated via catalytic oxidation. Figure 10 provides a possible depiction of location of remedial components.
Cost estimates are: Capital/ $ 3,071,000; Annual O & M/ $ 320,000. In addition to conventional remedial design, some pilot work is likely necessary. SVE is to be accomplished through placement of wells in vadose zone near source areas. SVE wells are estimated to be about 25' depth, with a total flow rate about 1200 std. cfm. As noted pilot work may refine these estimates. Air sparging, to supplement SVE, would be conducted in shallower portions of the saturated zone. Air sparging wells may be about 50' in depth.

Multiphase extraction system with air stripper usage to manage collected VOCs. Subsequent surface water discharge to a nearby creek is then expected.
Cost estimates are: Capital/ $ 1,435,000; Annual O & M/ $ 128,000.

Up to 10 extraction wells, each about 25' deep, may be utilized.

It may take 15-25 years to achieve Area 7 cleanup objectives, and sufficiently cleanse near surface soils so as to allow for unfettered usage, plus remove sufficient VOCs such that Area 7 no longer serves as a major future contributor of contaminants entering the plume as a whole.

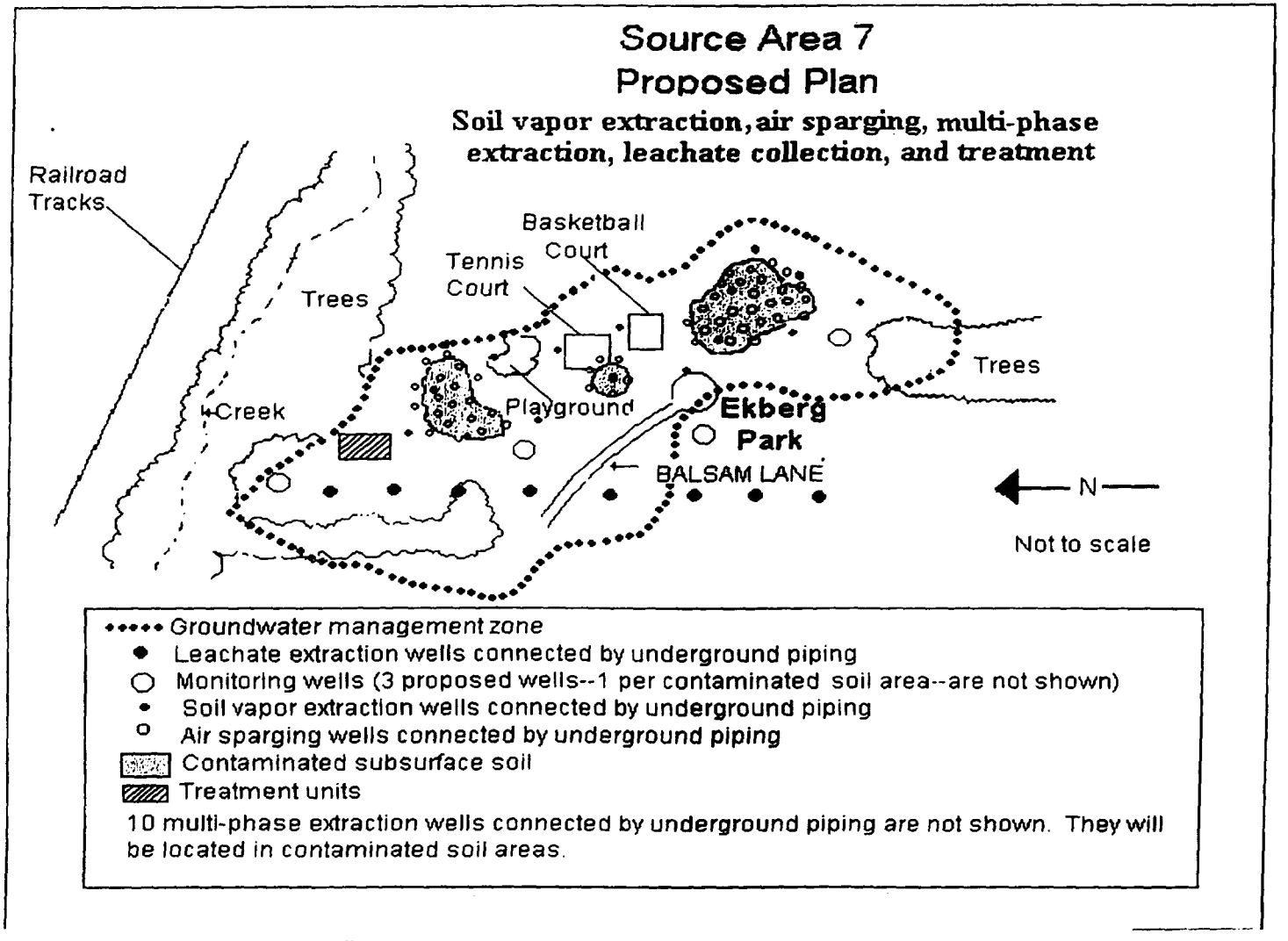


Figure 10 - Area 7 - Possible Layout - Source Remedial Components

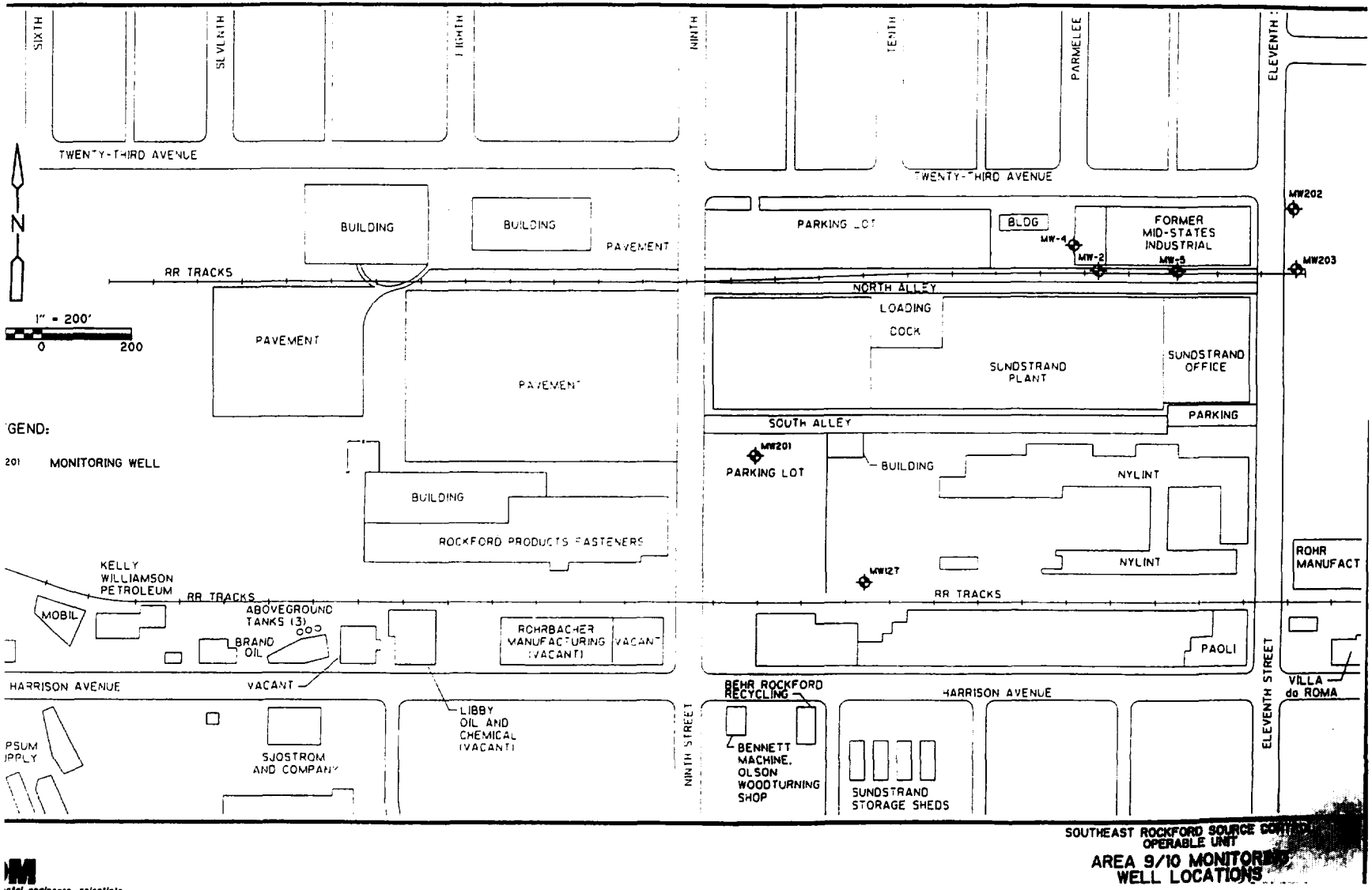


Figure 11 - Area 9/10 Features

Area 9/10 - Description and Source Control//Leachate Control Measures

Source Areas Nine and Ten have been combined and evaluated together as Area 9/10. Area 9/10 is an industrial area that is bounded by Eleventh Street on the east, Twenty-third Avenue on the north, Harrison Avenue on the south, and Sixth Street on the west. The properties to the immediate north of Area 9/10, across Twenty-third Avenue, are residential and are zoned as such. South of Area 9/10, across Harrison Avenue, properties are used for both commercial and residential purposes. Area 9/10 is zoned as light industrial, while the properties to the south are zoned mixed residential and commercial. Figure 11 provides information about Area 9/10. Problems regarding site access and concern over underground utilities at Area 9/10 have limited past investigations and their ability to provide complete and accurate information about the sources located in this area.

Area 9/10 has a history of industrial activity that extends back at least as far as 1926 when the Rockford Milling Machine and Rockford Tool companies merged to become the Sundstrand Machine Tool Company, located at the northwest corner of Eleventh Street and Harrison Avenue. Current industries that operate in the area include Sundstrand Corporation's Plant #1, Paoli Manufacturing, Rockford Products Corporation,, and J.L. Clark. Mid-States Industrial Company (also known as Rockford Power Machinery), Nylint Corporation, and Rohrbacher Manufacturing were also primary facilities in the area but are no longer in operation.

The geology at Area 9/10 is unconsolidated sand and gravel to a depth of at least 101 feet bgs as determined by SB9/10-201. No clay or silt units were encountered (with the exception of some fill material within 8 feet of the ground surface) in the borings conducted by CDM for the OU # 3 investigation. Information from boring logs for two borings conducted near the intersection of Ninth and Harrison Avenue indicate that the unconsolidated sand and gravel in Area 9/10 continues to approximately 235 feet bgs where bedrock is encountered. One of the boring logs from Illinois State Geological Survey well records identifies a till unit from 120 to 130 feet bgs. Borehole drilling just west of Area 9/10 at the intersection of Twenty-third Avenue and Fourth Street indicated that the unconsolidated sediments are at least 169 feet thick, with a 12 foot-thick clay unit from 132 to 144 feet bgs. The water table at Area 9/10 is generally encountered between 30 and 35 feet bgs.

Investigation results, summarized below, indicate that significant sources of VOC contamination exist within Area 9/10. Four primary potential source locations within Area 9/10 were investigated and are discussed below.

Sundstrand Plant #1

Available information regarding Sundstrand Plant #1 (Illinois EPA 104e Requests; Harding Lawson Associates 1992) documents the existence of three potential source areas at the facility: 1) the Outdoor Storage Area; 2) the loading dock; and 3) the Waste Recycling Area. The Outdoor Storage Area which was formerly located at the southwest corner of the Sundstrand parking lot (Ninth Street and Twenty-third Avenue) was used to store VOC bearing materials and

soils in this vicinity had elevated VOCs. Additionally, an underground storage tank (UST) adjacent to the Outdoor Storage Area was used to store VOCs. The loading dock at Plant #1 has contained approximately 14 USTs at various times between 1962 and 1987. The USTs had a variety of contents, including solvents, cutting oils, fuel oils and jet fuel. The third potential source at Sundstrand's Plant #1, the Waste Recycling Area is located inside the facility, and up gradient of the west end of the Nylint building.

Mid-States Industrial

A drum storage area at the Mid-States Industrial facility (formerly Rockford Power machinery) is another potential source at Area 9/10. Trichloroethene was identified in the shallow soils in this vicinity up to 67ppm

Nylint

Investigations conducted during the OU #3 RI at the property formerly leased by Nylint found high 1,1,1-TCA concentrations in soil gas at the west end of the building, suggesting a potential nearby source. Soils samples from the area did not detect elevated VOCs, indicating that soil gas is either migrating from an adjacent area where soil samples were not collected, or that volatilization from the groundwater is responsible for observed soil gas concentrations.

Rockford Products

Elevated concentrations of VOCs in soil gas (>1,000ppb) at the Rockford Products facility on Ninth Street indicate that this is a potential source. As with Nylint, soils samples from the area did not detect elevated VOCs, indicating that soil gas is either migrating from an adjacent area, possibly beneath the building, or volatilizing from the groundwater causing elevated soil gas concentrations in the vicinity.

Figure 12 provides a depiction of one possible means of how Area 9/10 remedial components could be deployed. Soil source/vadose zone and groundwater management/leachate zone portions of remediation technologies as selected within OU #3 for Area 9/10 include, respectively:

Soil vapor extraction with activated carbon treatment -

Cost estimates: Capital/ $ 225,000; Annual O & M: $ 329,000 The extraction wells would be screened in the vadose zone. A pilot program is likely needed for determination of proper well spacing, zone of influence, screen length and depth, etc. As a part of source control efforts, findings of significant groundwater contamination in shallower portions of the unconsolidated aquifer could lead to employment of air sparging as a supplement to SVE usage. Capital costs for air sparging supplemental control are estimated at $ 2,700,000, with about $ 65,000 for annual O & M. Unusual conditions, such as finding pockets of NAPL materials, or significantly less permeable soils, could lead to other SVE supplemental technology, such as dual phase extraction, as opposed to air sparging.

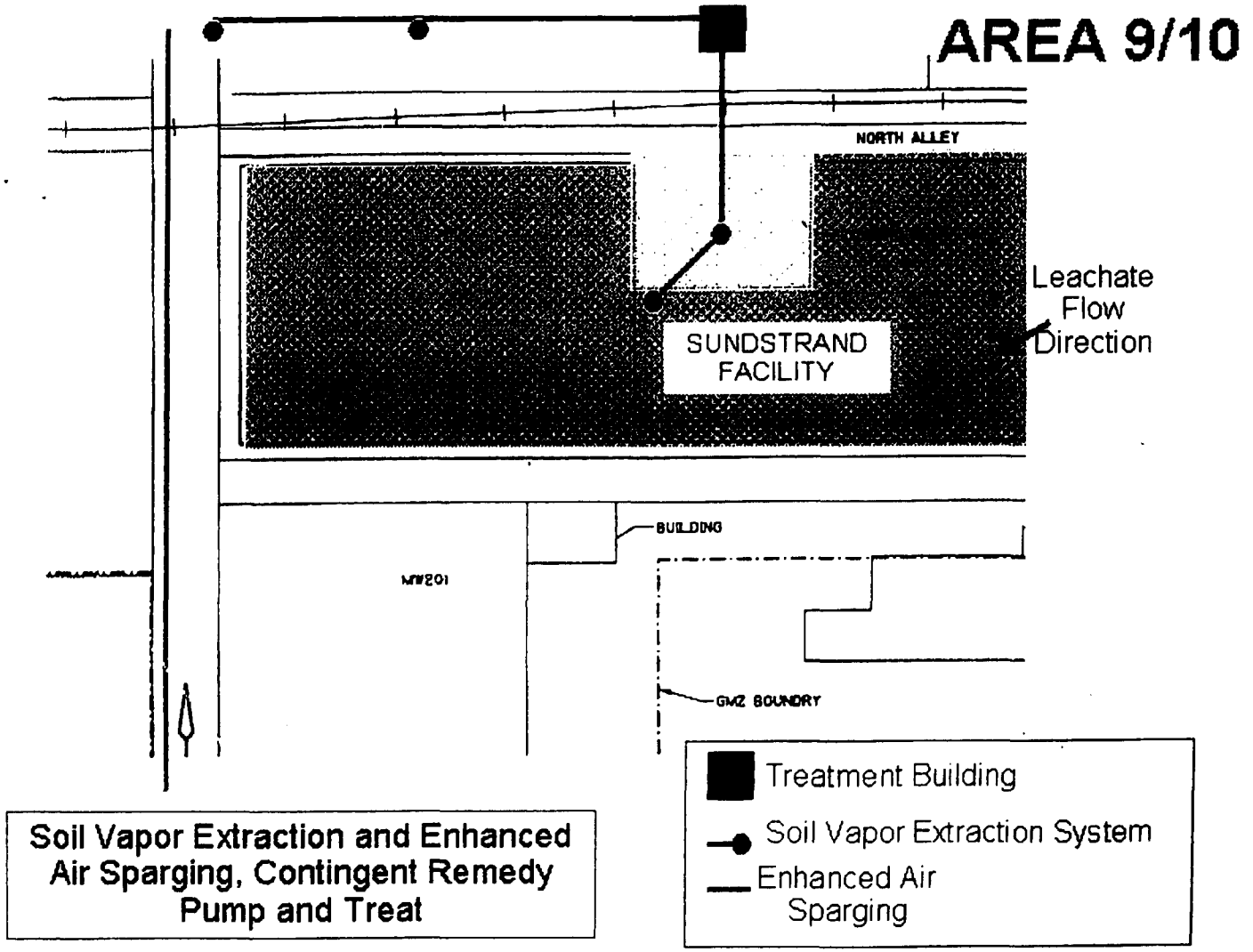


Figure 12 - Area 9/10 - Possible Layout - Source Remedial Components

A portion of the Area 9/10 remedy is contingent upon how well vadose zone and shallow groundwater source control efforts, such as air sparging, function in eliminating Area 9/10 as a future significant additional loading source to the overall SERGWC plume of contamination. If significant deeper groundwater contamination is noted, and cannot be related to up gradient conditions nor addressed by technologies such as SVE as supplemented by either air sparging or dual phase extraction, then pump and treat methodology may need to be employed for the Area 9/10 groundwater management zone.

Area 11 - Description and Source Control Measure Selected

Source Area Eleven (Area 11) is located east of Eleventh Street at the corner of Eleventh Street and Harrison Avenue. Area 11 is bordered on the east and west by industrial facilities. Properties to the immediate north of Area 11 are industrial while land uses further north (north of Twenty-third Avenue) include industrial mixed with some residences. South of Area 11, across Harrison Avenue, properties are used for both commercial and residential purposes. Area 11 continues to be dominated by industrial activities. Area 11 is comprised of several industrial properties and one commercial property. The Area is zoned light industrial and commercial. Figure 13 provides a depiction of some Area 11 features.

The geology at Area 11 is unconsolidated sand and gravel to a depth of at least 62 feet bgs as evidenced by SB11-202. Information from boring logs for two borings conducted approximately one block east of Area 11 near the intersection of Ninth and Harrison Avenue indicate that the unconsolidated sand and gravel in the general area continues to approximately 235 feet bgs where bedrock is encountered. The water table at Area 11 was encountered at approximately 20 - 25 feet bgs during the OU #2 investigation and closer to 30- 34 feet bgs during the during OU # 3 investigation

Area 11 currently includes the Rohr Manufacturing facility (formerly Rockwell Graphics Systems), H and H Wood Products and Pallets, Villa di Roma Restaurant, and adjacent parking lots. Historically, Rockford Varnish, Rockford Coatings, and Rockwell Graphics Systems have conducted manufacturing activities in Area 11.

The Rockford Coatings Corporation, formerly located at 1620 Harrison Avenue, manufactured several paint products including enamels, lacquers, and water-based paints. The use of chlorinated solvents at the facility is unknown. The Rockford Coatings Corporation discontinued operations in 1983.

Rockford Varnish Company, formerly located at 11th and Harrison Avenue, manufactured varnish and related products for the furniture industry from 1906 until 1983. Rockford Varnish used VOCs, including chlorinated solvents, in its operations and stored these compounds on-site in approximately eight above-ground storage tanks. Groundwater sampling results near the facility indicate chlorinated solvent contamination.

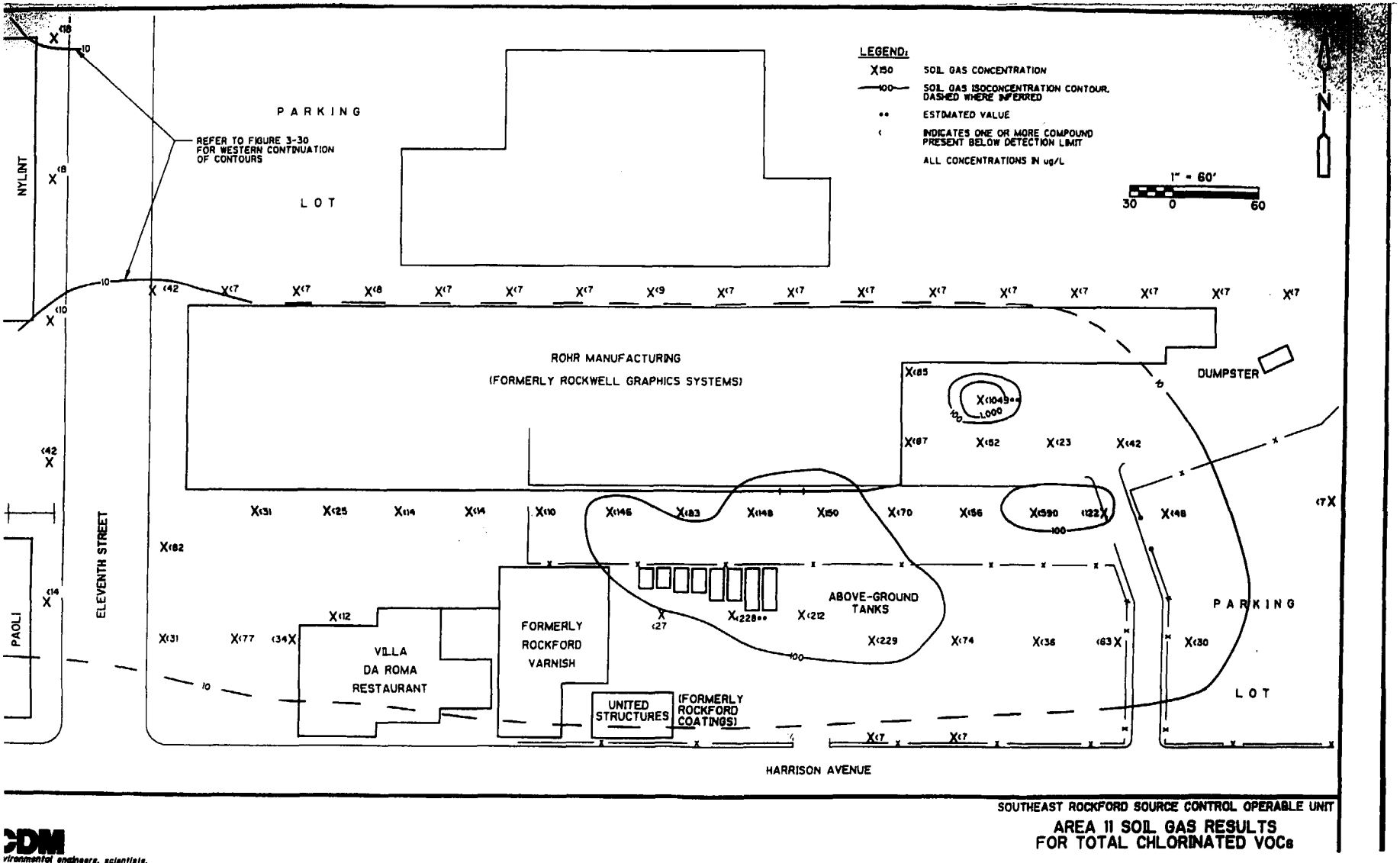
Rockwell International Graphics, formerly located at 2524 11th Street, manufactured gears and rollers for newspaper presses until approximately 1991. The facility used 1,1,1-TCA for cleaning rollers until 1983. Areas of concern near the former Rockwell facility include a dumpster located south of Rockwell that apparently leaked cutting oils onto the ground surface and a pit to the north of the property that contained standing water with an oil sheen. The Rockwell facility is now owned by P.H. Partners Co., who lease it to Rohr Manufacturing. Present operations include painting industrial equipment.

Several contaminant release and migration pathways exist in Area 11. One potential contaminant source is the eight aboveground storage tanks that previously contained VOCs (including chlorinated solvents) used in operations at the former Rockford Varnish Facility. Potentially leaking tanks and aboveground piping may have released contaminants to the vadose zone. A second contaminant source, a bunker, reportedly used by Rockford Varnish Company is located in the railroad right-of-way south of the former Rockwell property. This bunker has previously seeped a tar-like substance. Historical reports indicate that a dumpster used by Rockwell Graphics leaked cutting oils onto the ground surface and that a pit to the north of Rockwell contained standing water with an oil sheen.

Investigations conducted at Area 11, summarized below, identified two distinct zones of subsurface contamination. One zone is located on the western margin of Area 11 centralized beneath Rohr Manufacturing, and extending area north, south, and west of the building. Soil samples within this zone showed elevated concentrations of toluene, ethyl benzene, xylene, and acetone as well as the presence of NAPL. A second zone of contamination exists near the above ground storage tanks to the northeast of the former Rockford Varnish building. Soil samples in this zone identified elevated concentrations of toluene, xylenes, and PCE. Within both zones of elevated contamination, the high levels of toluene, ethyl benzene, and xylene (often referred to as BTEX), masked lower levels of chlorinated VOCs that were likely present. Figure 14 provides one possible means of how Area 11 remedial components could be deployed.

Soil source/vadose zone and groundwater management/leachate zone portions of remediation technologies as selected within OU #3 for Area 11 include, respectively:

Soil vapor extraction wells with vapor emissions treatment using catalytic oxidation -
Estimated costs are: Capital/ $ 543,500; Annual O & M/ $ 212,880
While usage of five SVE extraction wells is currently projected, as noted above, design and pilot tests could refine estimates on number of wells, spacing, depth, screen setting and length, etc. Due to the possible presence of NAPLs, well casing may be constructed of steel in case steam injection is necessary. Pending the amount of vapors generated, which could be considerable initially, future operation and maintenance cost projections could justify a switch to vapor control via GAC from initial catalytic oxidation equipment if vapor generated tapers off. For the Area 11 groundwater management zone, no action other than monitoring and usage restriction is believed to be necessary at this time. This is because BIOSCREEN model analysis indicates that BTEX concentrations in site interior do not pose a groundwater threat at GMZ boundary.



SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT

AREA II SOIL GAS RESULTS FOR TOTAL CHLORINATED VOCs

CDM
environmental engineers, scientists, planners, & management consultants

Figure 13 - Area 11 Features

However, if there were confirmation of LNAPL, this could cause remedy adjustment to limited pump and treat collection efforts for such LNAPL.

Remedy Implementation

Remedy implementation at the SERGWC site falls into two broad areas. Portions of the remedy have dealt with the contaminated aquifer through such means as avoiding ingestion of contaminated groundwater through extension of clean water supply, and with means of restoring the aquifer as a whole through natural attenuation. Past site removal action, plus OU #1 and OU #2, focused on this aspect of the site. Actions under those responses/operable units are now either in the operation and maintenance phase (e.g., extension and hook up to clean municipal supply), or in the remedial action phase (e.g., the natural attenuation process). OU #3, dealing with source control measures, has recently gone through the remedy selection phase, and is now in the remedial design phase.

O & M Data and Overall Groundwater Remedial Action to Date

In conformance with the terms of a remedial action consent decree, the City of Rockford has established a groundwater well monitoring network, and periodically reports results to U.S. EPA. To illustrate this matter, please refer to Figure 15 for a depiction of monitoring well location and intake depths. Table 2 provides data for which the City of Rockford summarized and tabulated all monitoring results compiled from June 1999 to October 2001. More recent reports are also included for 2002 sampling events, with the latest such report being received in January 2003 regarding an October 2002 sampling event. As this Five Year Review Report was being compiled, further groundwater network sampling was conducted by the City of Rockford in April 2003.

In briefly assessing the results to date, no striking trends regarding progress toward aquifer restoration goals as a whole are revealed upon examining the 1999-present groundwater quality results. This is not too surprising a development given the fact that remedial actions concerning major sources are yet to take place.

On a very localized basis, some results are of interest. In the mid 1990s, original monitoring well MW-201, located within source Area 9/10, showed sufficiently high enough levels of contaminants that the IL EPA was concerned about the possible presence of NAPL near this location. Chlorinated VOCs totaled about 15-17 milligrams/liter. Around 1998, the original MW-201 was destroyed, possibly through snow plowing activity. The "new" MW-201, located about 50' away from the original position due to subsequent access considerations, did not at first reveal nearly as high a level of contamination, as the 1999-2001 results indicate a total

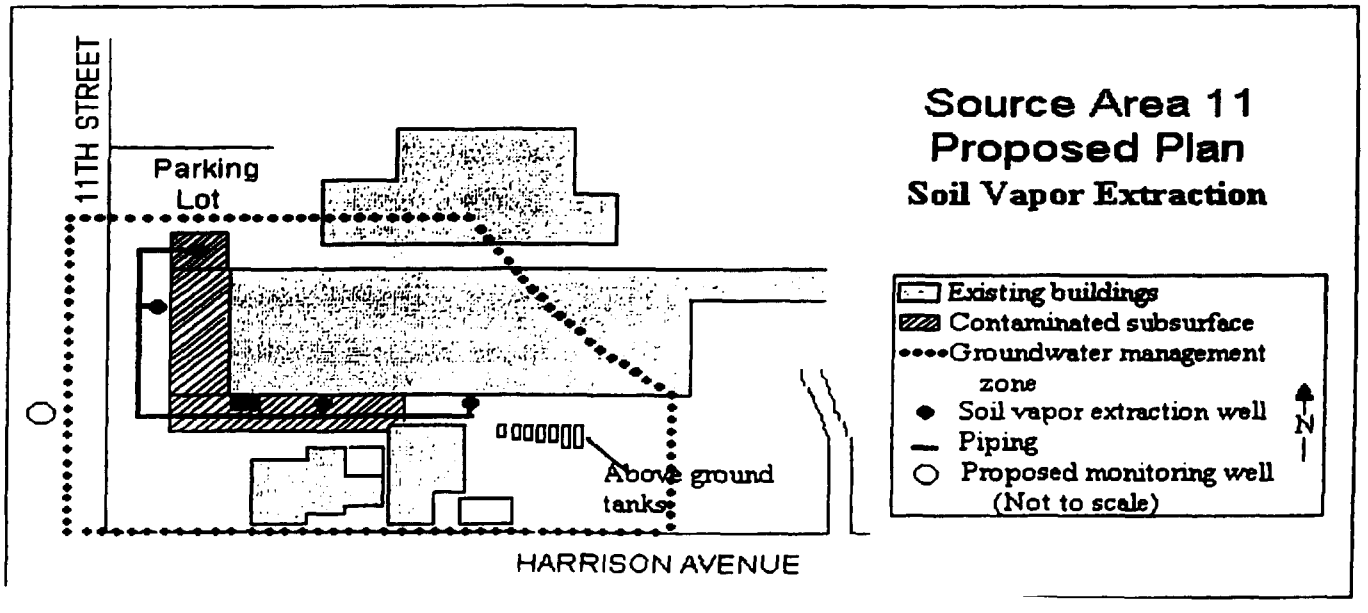


Figure 14 - Area 11 - Possible Layout - Source Remedial Components

chlorinated VOCs level nearly an order of magnitude less. However, in the report received in August 2002, representing April 2002 sampling efforts, total chlorinated VOCs jumped back up to 11-12 milligram/liter levels. Results received in January 2003 for sampling conducted in October 2002 also indicate total chlorinated VOCs at the 11-12 milligram/liter level. The reviewing agencies will continue to monitor this situation, since such variance might indicate a possible nearby source requiring control as part of Area 9/10 effort.

A question may be asked: Do the groundwater monitoring network results obtained to date provide any indication of the natural attenuation process; are compounds detected that might be logical breakdown products of site contaminants? If so, this would buttress the case that natural attenuation could achieve the ARARs levels desired in the180-205 year time period suggested as acceptable by the OU #2 ROD. Of VOCs with three or more chlorine atoms in the molecule, such as 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene, a look at City of Rockford monitoring data indicates that of these three compounds, 1,1,1-trichloroethane occurs at significantly higher concentrations than the other, attaining levels of around 1 milligram/liter at wells MW-101A, MW-101B, MW-102C, MW-133B, and MW-201. At these same monitoring wells, VOCs with two chlorine atoms in the molecule, such as cis- 1,2-dichloroethene, 1,1-dichloroethene, or 1,1-dichloroethane tend to equal or sometimes exceed concentrations of the trichlorinated species. For example, cis-1,2- dichloroethene exceeds 1 milligram/liter at MW-101A, is nearly 1 milligram/liter at MW-133B, and is over 2 milligram/liter at MW-201. 1,1-dichloroethane reaches 7-8 milligram/liter at MW-201. Hence, qualitatively there is some indication that more highly chlorinated compounds may be breaking down. As will be indicated in the discussion below, there is some indication in the literature that the presence of cis-1,2-dichloroethene may be attributable as an intermediate "daughter product" decomposition product.

Biotic Degradation

While there are other literature sources which describe these processes, one useful element within a 1999 ARCADIS Technical Memorandum within Section 4 of that document is a brief discussion of attenuation of chlorinated VOCs. The reader is reminded that there are several attenuation mechanisms, consisting of physical and biological processes, which may contribute to changes in contaminant phase or concentration. Physical, non-destructive attenuation mechanisms consist of such processes as dispersion, adsorption, and volatilization. Destructive transformation pathways may occur abiotically in limited cases - the reference cites trichloroethane undergoing abiotic chemical change to acetic acid. However, the case of most interest concerns biotic degradation of chlorinated ethanes and ethenes. The Technical Memorandum predicts a biotic degradation sequence for trichloroethene (TCE) as follows:

trichloroethene (yields) dichloroethene (yields) vinyl chloride (yields) ethene (yields) ethane (yields) carbon dioxide and water

Southeast Rockford Superfund Site

Well Location Diagram

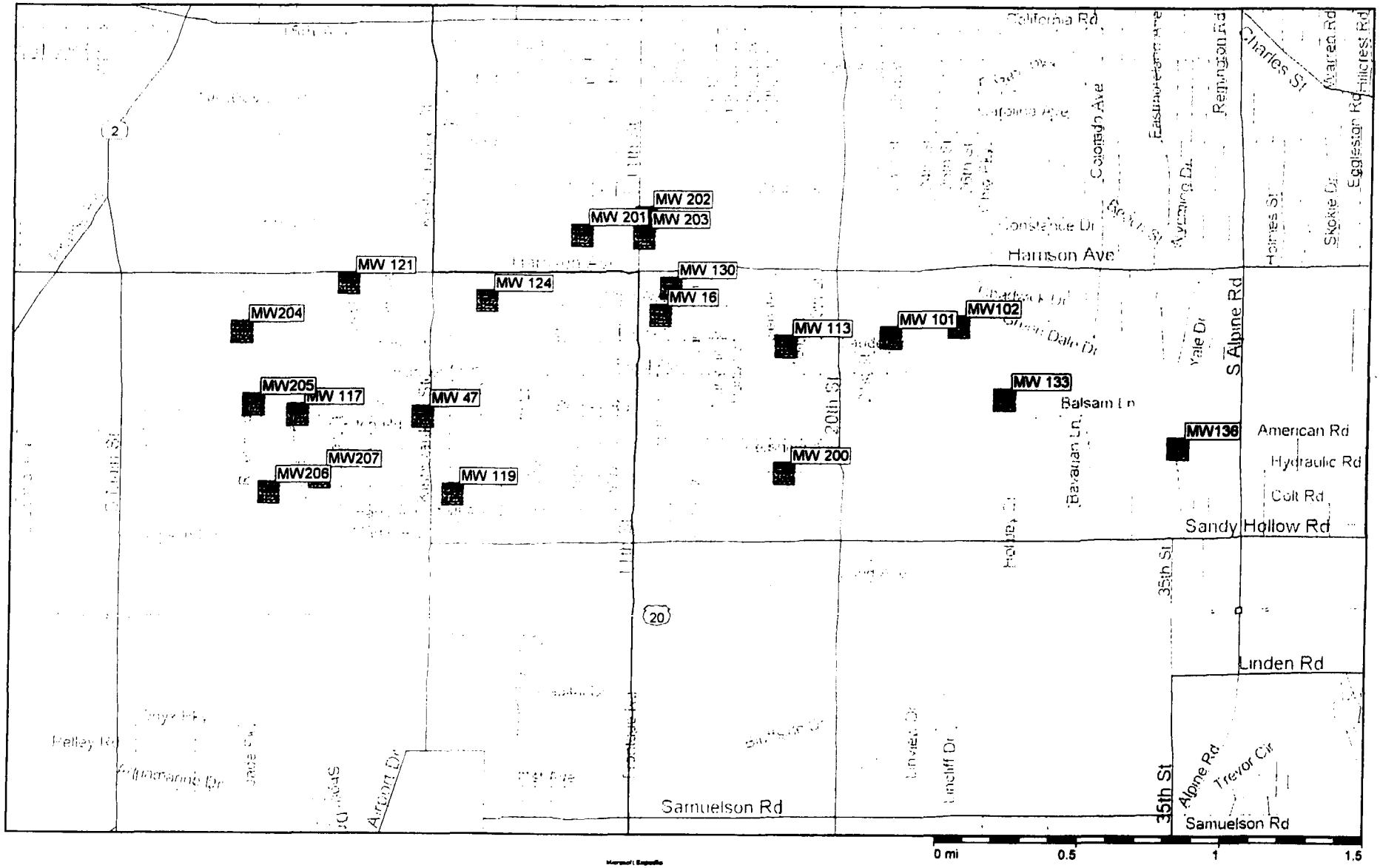


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Figure 15 - City of Rockford Groundwater Well Monitoring Network

Groundwater Monitoring Network
Southeast Rockford Groundwater Contamination Site

No. Wells at Location	Monitoring Well(s)	Depth to Screen Base (ft. bgs)	Location Description
1	IW 19	75.0	Between Olsen Street and Rock River. (ComEd property). Not sampled – alternate MW47 used.
1	MW 16	47.7	East of Kinsey Street, north of drain canal
1	MW 47	54.49	Brooke Rd. 1/2 Block West of Kishwaukee Intersection. In shoulder on North side of road.
4	MW 101-A MW 101-B, MW 101-C MW 101-D	88.0 150.1 172.0 212.8	Corner of Laude and 24th Street
3	MW 102-A MW 102-B MW 102-C	35.0 98.0 184.3	South of railroad tracks, east of Laude Street (Owens-Corning property)
2	MW 113-A MW 113-B	105.0 155.0	West of Willis and 18th Street
2	MW 114-A MW 114-B	95.0 220.0	Corner of Willis and Kinsey Street
3	MW 117-B MW 117-C MW 117-D	89.5 159.5 200	Brooke Rd meridian. West of Grant Park Blvd.
1	MW 119	59.5	Corner of Sawyer and South 4th Street
1	MW 121	64.5	Corner of Harrison Ave. and Olsen Street
1	MW 124	100.0	South of Park Court, west of railroad track
1	MW 130	37.5	Corner of Alton Ave. and Sewell Street
3	MW 133-A MW 133-B MW 133-C	35.0 58.0 96.0	West end of Balsam Lane

Groundwater Monitoring Network
Southeast Rockford Groundwater Contamination Site

No. Wells at Location	Monitoring Well(s)	Depth to Screen Base (ft. bgs)	Location Description
1	MW 136	45	North end of New England Drive
1	MW 200	90	Southeast of 17th Street and Sawyer
1	MW201	N/A	Northeast Corner of Rockford Products Parking lot on the East side of 9th St. , North of Harrision Ave.
1	MW 202	Well depth	West of 11th Street, South of Harrison Ave./23rd Street (Abe Pekarsky property)
1	MW 203	Well depth	West of 11th Street, South of Harrison Ave./23rd Street (Abe Pekarsky property)
1	MW 204	90	End of Falund Street
2	MW 205-A MW 205-B	110 150	North of Brooke Road along Rock River
3	MW 206-A MW 206-B MW 206-C	90 130 250	Between River Blvd. and the Rock River
1	MW 207	90	Corner of Martin Road & Grant Park Blvd.
35			

NOTES:

1. MW 47 is alternate monitoring location for IW-19
2. Total wells in groundwater monitoring network is 35.
3. bgs means below ground surface.

Table 1. SE Rockford Superfund Site Cummulative Ground Water Results (June 1999 - October 2001).

MW-16

	1st Q 6/1/99	2nd Q 10/26/99	3rd Q 1/31/00	4th Q 4/24/00	5th Q 7/27/00	6th Q 11/13/00	1st SA 4/12/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.8	2.5 J	16	16	12	2.8 J	14	22
cis-1,2-Dichloroethene	140	130	120	130	130	150	150	160
1,1-Dichloroethene	24	23	2.2 J	2.0 J	3.8 J	20	3.1 J	10 U
1,1-Dichloroethane	76	73	75	79	75	87	74	88
Chloroform	3	2.3 J	2.3 J	2.5 J	2.7 J	2.2 J	2.3 J	2.5 J
1,2-Dichloroethane	1.2	10 U	10 U	5.0 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	170	170	170	160	160	140	180	210
Trichloroethene	64	65	68	65	58	55	64	72
Tetrachloroethene	5.4	5.2 J	5.9 J	5.7	5.2 J	5.0 J	5.8 J	7.1 J

MW-47

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/17/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/08/00	1st SA 4/12/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1.3	4.5	0.18 J	0.36 J	0.38 J	0.25 J	0.31 J	1.0 U
1,1-Dichloroethene	0.49 J	0.87 J	0.1 J	0.18 J	0.13 J	0.10 J	1.0 J	1.0 U
1,1-Dichloroethane	1.1	1.1	0.32 J	0.53 J	0.61 J	0.55 J	0.57 J	0.21 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.17 J	0.28 J	0.92 J
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	3.5	6.5	1.0 U	1.0	1.2	0.58 J	1.1 J	0.34 J
Trichloroethene	2.8	5.7	0.58 J	0.66 J	0.82 J	0.37 J	0.56 J	0.25 J
Tetrachloroethene	0.53 J	2.2	0.27 J	0.27 J	0.64 J	0.45 J	0.48 J	0.38 J

MW-101A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/27/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/08/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	9.3	7.0 J	40 J	7.8 J	10 J	8.3 J	8.6 J	12 J
cis-1,2-Dichloroethene	540	620	690	720	730	830	780	990
1,1-Dichloroethene	63	64	61	65	51	77	81	79
1,1-Dichloroethane	230	240	270	240	210	310	240	300
Chloroform	7.3	5.6 J	6.2 J	7.0 JB	6.1 J	6.3 J	5.6 J	6.3 J
1,2-Dichloroethane	3.4	50 U	50 U	50 U	20 U	50 U	50 U	50 U
1,1,1-Trichloroethane	580	610	740	690	620	740	830	1000
Trichloroethene	200	220	270	220	140	250	270	300
Tetrachloroethene	16	14 J	15 J	50 U	4.4 J	15 J	14 J	15 J

MW-101B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/27/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	10 U	3.2 J	50 U	5.2 J	4.0 J	3.9 J	50 U	4.0 J
cis-1,2-Dichloroethene	520	430	490	510	700	550	570	580
1,1-Dichloroethene	36	38	33 J	37 J	41	35	42 J	33
1,1-Dichloroethane	150	140	140	150	150	170	140	150
Chloroform	3.6 J	3.6 J	50 U	4.5 J	4.4 J	3.3 J	50 U	3.5 J
1,2-Dichloroethane	10 U	25 U	50 U	50 U	20 U	25 U	50 U	25 U
1,1,1-Trichloroethane	690	580	570	590	750	450	620	440
Trichloroethene	140	150	150	140	140	120	160	140
Tetrachloroethene	45	47	42 J	33 J	39	18 J	39 J	21 J

MW-101C

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/27/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	10 U	2.5 J	2.8 J	3.5 J	2.7 J	2.7 J	3 J	11 J
cis-1,2-Dichloroethene	550	380	370	420	390	420	420	510
1,1-Dichloroethene	34	31	28	28	25	24 J	27	21 J
1,1-Dichloroethane	140	110	110	120	110	130	100	120
Chloroform	3.5 J	3.0 J	20 U	3.9 J	3.6 J	2.6 J	2.5 J	2.9 J
1,2-Dichloroethane	10 U	25 U	20 U	50 U	20 U	25 U	25 U	25 U
1,1,1-Trichloroethane	740	480	460	450	390	370	450	470
Trichloroethene	140	130	120	100	82	100	110	110
Tetrachloroethene	45	42	42	31 J	21	34	37	32

MW-101D

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/27/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	NO	1.5 J	1.9 J	1.1 J	1.3 J	1.9 J	2.0 J
cis-1,2-Dichloroethene	230	SAMPLE	130	250	180	210	250	260
1,1-Dichloroethene	24		14	23	14	17	21	22
1,1-Dichloroethane	80		42	70	60	76	66	70
Chloroform	2.6 J		1.6 J	2.4 JB	2.5 J	2.2 J	2.2 J	2.3 J
1,2-Dichloroethane	5.0 U		10 U	20 U	1.2 J	1.3 J	10 U	20 U
1,1,1-Trichloroethane	300		180	270	180	180	250	300
Trichloroethene	80		54	81	33	46	73	80
Tetrachloroethene	23		18	23	2.9 J	3.8 J	18	26

MW-102A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.8	1.7 J	3 J	1.4 J	2.5 J	2.7 J	4.4 J	4.1 J
cis-1,2-Dichloroethene	54	61	90	49	95	110	140	110
1,1-Dichloroethene	1.2	2.5 J	2.8 J	1.5 J	2.7 J	2.8 J	4.2 J	2.3 J
1,1-Dichloroethane	43	43	64	43	71	91	91	77
Chloroform	1.0 U	5.0 U	5 U	5.0 U	10 U	5.0 U	10 U	10 U
1,2-Dichloroethane	0.25 J	5.0 U	5 U	5.0 U	10 U	5.0 U	10 U	10 U
1,1,1-Trichloroethane	51	57	97	57	100	88	120	88
Trichloroethene	6.3	15	14	7.6	16	14	22	16
Tetrachloroethene	0.60 J	3.1 J	5 U	5.0 U	10 U	5.0 U	10 U	10 U

MW-102B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	2.1	2.7	0.28 J	0.48 J	0.54 J	0.62 J	0.71 J	1.2
1,1-Dichloroethene	0.32 J	0.40 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	0.99 J	0.93 J	0.32 J	0.36 J	0.62 J	0.76 J	0.71 J	0.83 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	0.63 J	0.66 J	0.47 J	0.49 J	0.54 J	1.0 U	0.61 J	1.0 U
1,1,1-Trichloroethane	1.4	5.1	1.0 U	0.20 J	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	2.1	3.7	1.0 U	0.092 J	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.1	2.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-102C

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	10 U	25 U	0.57 J	0.96 J	0.41 J	0.26 J	5.0 U	0.39 J
cis-1,2-Dichloroethene	390	460	61	65	39	28	39	53
1,1-Dichloroethene	59	78	12	5.2	4.5	4.5	2.6 J	8.9
1,1-Dichloroethane	180	200	32	44	29	19	48	29
Chloroform	2.5 J	3.0 J	0.66 J	0.91 J	0.64 J	0.32 J	0.94 J	0.60 J
1,2-Dichloroethane	4.0 J	25 U	0.91 J	5.0 U	0.80 J	2.0 U	5.0 U	4.0 U
1,1,1-Trichloroethane	170	250	60	60	44	23	90	46
Trichloroethene	140	170	26	10	8.2	8.3	5.4	17
Tetrachloroethene	33	46	5.9	0.67 J	0.99 J	1.1 J	0.8 J	3.5 J

MW-113A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.2	2.4 J	5.7 J	13	7.5 J	12	15	22
cis-1,2-Dichloroethene	52	160	160	160	110	200	210	240
1,1-Dichloroethene	10	27	16	5.1 J	4.0 J	9.4 J	10	3.0 J
1,1-Dichloroethane	34	100	91	92	86	130	100	110
Chloroform	0.90 J	2.3 J	2.1 J	2.1 JB	2.3 J	2.3 J	2.4	2.8 J
1,2-Dichloroethane	0.40 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	59	160	160	160	130	170	200	200
Trichloroethene	24	69	71	61	22	62	81	75
Tetrachloroethene	1.9	3.2 J	2.9 J	2.4 J	10 U	2.1 J	3.7 J	3.3 J

MW-113B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	0.65 J	5.0 U	0.83 J	0.98 J	0.91 J	1.3 J	1.0 J	1.1 J
cis-1,2-Dichloroethene	38	39	62	56	49	62	53	67
1,1-Dichloroethene	12	8.4	11	11	9.4	11	8.9	12
1,1-Dichloroethane	33	33	48	43	38	55	40	50
Chloroform	0.54 J	0.45 J	0.65 J	0.61 JB	0.71 J	0.63 J	0.56 J	0.64 J
1,2-Dichloroethane	0.56 J	5.0 U	5 U	5.0 U	0.60 J	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	17	13	27	21	17	22	17	24
Trichloroethene	19	20	30	26	20	27	20	29
Tetrachloroethene	1.8	1.3 J	1.4 J	1.2 J	0.89 J	1.4 J	5.0 U	5.0 U

MW-114A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/31/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	25 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	14	11 J	6.6 J	5.6 J	5.4 J	4.7 J	3.9 J	3.6 J
1,1-Dichloroethene	46	48	34	26	24	20	18	15
1,1-Dichloroethane	6.7	7.1 J	5 J	4.2 J	3.9 J	4.2 J	2.7 J	2.5 J
Chloroform	5.0 U	25 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	25 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U
1,1,1-Trichloroethane	250	290	220	160	140	120	120	100
Trichloroethene	34	47	33	24	22	19	20	18
Tetrachloroethene	1.9 J	25 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U

MW-114B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/31/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	3.3	3.3	2.3	1.7	3.0	2.4	2.9	2.2
1,1-Dichloroethene	0.60 J	0.46 J	0.18 J	0.11 J	0.26 J	0.13 J	0.26 J	0.13 J
1,1-Dichloroethane	0.89 J	1	0.81 J	0.68 J	1.0	1.2	0.98 J	0.96 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	4	1.2	1.0 U	0.050 J	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	6.2	8.2	5.7	1.8	7.9	3.5	8.2	4.8
Tetrachloroethene	1	0.66 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-117B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/26/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	5.0 U	5 U	2.0 U	2.0 U	2.0 U	0.25 J	2.0 U
cis-1,2-Dichloroethene	16	17	18	19	15	18	13	16
1,1-Dichloroethene	14	14	9.5	11	9.6	11	7.3	7.5
1,1-Dichloroethane	7.3	7.7	8	8.1	6.6	10	5.8	7.1
Chloroform	0.72 J	0.58 J	0.36 J	0.39 J	0.49 J	0.42 J	0.37 J	0.35 J
1,2-Dichloroethane	0.54 J	5.0 U	5 U	0.42 J	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	83	68	59	49	42	37	28	23
Trichloroethene	21	17	22	19	17	19	17	16
Tetrachloroethene	3.1	1.3 J	1.9 J	1.6 J	1.7 J	1.7 J	1.8 J	1.3 J

MW-117C

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	2.0 U	5.0 U	0.5 J	0.60 J	1.1 J	5.0 U	0.82 J	0.44 J
cis-1,2-Dichloroethene	69	82	94	94	99	100	120	110
1,1-Dichloroethene	44	53	53	49	48	50	59	45
1,1-Dichloroethane	54	60	61	54	55	69	57	48
Chloroform	0.77 J	5.0 U	0.82 J	0.79 J	1.0 J	0.79 J	0.84 J	0.81 J
1,2-Dichloroethane	2.3	5.0 U	5.0 U	2.2 J	2.4 J	2.4 J	2.3 J	5.0 U
1,1,1-Trichloroethane	75	94	93	91	89	78	99	74
Trichloroethene	36	40	41	39	38	34	42	32
Tetrachloroethene	6	7.5	9.7	10	8.7	8.8	12	11

MW-117D

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/17/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	2.0 U	10 U	5 U	5.0 U	5.0 U	5.0 U	0.39 J	5.0 U
cis-1,2-Dichloroethene	110	110	100	90	81	87	88	75
1,1-Dichloroethene	50	44	41	35	36	33	37	25
1,1-Dichloroethane	46	39	34	29	27	37	29	23
Chloroform	0.74 J	10 U	0.8 J	0.63 J	0.85 J	0.6 J	0.65 J	0.53 J
1,2-Dichloroethane	2	1.5 J	1.4 J	1.1 J	1.2 J	1.0 J	5.0 U	5.0 U
1,1,1-Trichloroethane	110	97	91	82	80	71	80	57
Trichloroethene	38	35	35	32	35	30	31	23
Tetrachloroethene	17	17	19	17	16	16	13	17

MW-119

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/26/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	0.36 J	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	0.28 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	0.39 J	0.21 J	0.23 J	0.26 J	0.27 J	0.26 J	0.29 J
Chloroform	1.0 U	0.26 J	0.19 J	0.16 J	0.12 J	1.0 U	1.0 U	0.10 J
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.8	2.6	0.75 J	0.79 J	0.88 J	0.72	0.85 J	0.71 J
Trichloroethene	1	2.0	0.2 J	0.20 J	0.21 J	0.18 J	0.19 J	0.16 J
Tetrachloroethene	0.63 J	1.4	0.18 J	0.19 J	0.22 J	0.18 J	0.17 J	0.15 J

MW-121

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/31/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	0.15 J	0.2 J	0.22 J	0.39 J	0.22 J	0.68 J	0.42 J
cis-1,2-Dichloroethene	7.2	8.4	6.3	5.6	6.8	7	6.7	6.5
1,1-Dichloroethene	6	8.0	5.5	3	4.4	8	2	3.6
1,1-Dichloroethane	3.4 J	3.8	2.9	2.8	3.5	4.6	3.7	3.8
Chloroform	5.0 U	0.67 J	0.65 J	0.55 J	0.68 J	0.77 J	0.78 J	0.82 J
1,2-Dichloroethane	5.0 U	0.78 J	2 U	0.72 J	0.82 J	0.89 J	0.82 J	0.81 J
1,1,1-Trichloroethane	3.8 J	5.5	3.4	2.8	4.3	5.1	5.5	5.9
Trichloroethene	26	29	23	11	20	22	22	19
Tetrachloroethene	2.7 J	3.4	2.5	0.64 J	1.8	2.6	2.3	2.4

MW-124

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/31/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	10 U	50 U	25 U	3.9 J	20 U	20 U	2.1 J	1.4 J
cis-1,2-Dichloroethene	1,200	560	540	440	330	300	240	190
1,1-Dichloroethene	94	41 J	36	24 J	20	20	35	19
1,1-Dichloroethane	74	50	95	92	89	110	47	98
Chloroform	10 U	50 U	25 U	0.72 J	20 U	20 U	20 U	10 U
1,2-Dichloroethane	10 U	50 U	25 U	25 U	20 U	20 U	20 U	10 U
1,1,1-Trichloroethane	540	280	190	100	79	75	230	110
Trichloroethene	35	28 J	20 J	14 J	10 J	12 J	24	16
Tetrachloroethene	45	28 J	12 J	3.8 J	20 U	2.7 J	30	6.2 J

MW-130

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	25 U	25 U	50 U	20 U	25 U	20 U	50 U
cis-1,2-Dichloroethene	24	7.8 J	7.5 J	7.7 J	7.7 J	7.2 J	5.7 J	50 U
1,1-Dichloroethene	11	4.9 J	3.6 J	3.1 J	3.3 J	4.3 J	20 U	50 U
1,1-Dichloroethane	19	10 J	11 J	12 J	13 J	12 J	10 J	14 J
Chloroform	0.19 J	25 U	25 U	50 U	20 U	25 U	20 U	50 U
1,2-Dichloroethane	1.0 U	25 U	25 U	50 U	20 U	25 U	20 U	50
1,1,1-Trichloroethane	660	370	460	510	670	390	440	660
Trichloroethene	17	8.2 J	8.5 J	8.3 J	8.5 J	7.0 J	6.2 J	50 U
Tetrachloroethene	5.3	25 U	25 U	50 U	20 U	25 U	20 U	50 U

MW-133A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	0.27 J	1.8	0.16 J	1.0 U	1.0 U	0.49 J	1.0 U	1.2
1,1-Dichloroethene	1.0 U	0.66 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.10 J
1,1-Dichloroethane	1.0 U	0.52 J	0.081 J	1.0 U	1.0 U	1.0 U	1.0 U	0.41 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	0.95 J	4.6	0.38 J	0.35 J	1.0 U	0.81 J	1.0 U	1
Trichloroethene	1.1	4.8	1.0 U	1.0 U	1.0 U	0.11 J	1.0 U	0.19 J
Tetrachloroethene	0.37 J	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-133B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	7	7.1 J	50 U	50 U	10 J	9.5 J	43 J	49 J
cis-1,2-Dichloroethene	780	810	840	600	670	530	660	510
1,1-Dichloroethene	110	67	100	78	88	88	46	7.0 J
1,1-Dichloroethane	200	170	180	170	160	200	200	180
Chloroform	10	7.9 J	9.3 J	12 J	12 J	11 J	13 J	12 J
1,2-Dichloroethane	4.6	50 U	50 U	50 U	4.1 J	25 U	50 U	50 U
1,1,1-Trichloroethane	840	630	730	620	760	570	830	700
Trichloroethene	270	190	250	190	220	230	300	250
Tetrachloroethene	110	77	120	76	94	94	140	110

MW-133C

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	1.1 J	0.42 J	0.34 J	5.0 U	5.0 U	10 U	5.0 U
cis-1,2-Dichloroethene	100	91	32	28	30	31	36	31
1,1-Dichloroethene	47	40	23	21	18	22	28	14
1,1-Dichloroethane	57	49	31	28	28	35	36	31
Chloroform	8.5	7.2 J	5.4	4.7 JB	4.9 J	5.2	6.2 J	5.1
1,2-Dichloroethane	2.8 J	10 U	2.3 J	10 U	2.2 J	2.2 J	10 U	5.0 U
1,1,1-Trichloroethane	200	170	110	100	91	95	130	100
Trichloroethene	110	93	55	48	34	47	62	31
Tetrachloroethene	28	22	2.5 J	1.2 J	0.82 J	1.2 J	1.6 J	5.0 U

MW-136

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	3.5	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	0.88 J	0.37 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	0.35 J	0.34 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	0.37 J	1.5	0.74 J	0.57 JB	0.48 J	0.5 J	0.45 J	0.45 J
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	8	16	0.28 J	0.31 J	0.3 J	0.29	0.3 J	0.30 J
Trichloroethene	3.8	2.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.7	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-200

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	0.66 J	1.2	1.0 U	1.0 U	0.10 J	1.0 U	0.17 J	1.0 U
1,1-Dichloroethene	0.34 J	0.26 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	2.2	1.9	1.0 U	0.065 J	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	2.2	1.8	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.12 J
Tetrachloroethene	0.61 J	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-201

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	NO	NO	5.0 U	0.78 J	20 U	20 U	0.64 J	10 U
cis-1,2-Dichloroethene	SAMPLE	SAMPLE	85	87	220	180	60	120
1,1-Dichloroethene			1.1 J	1.9 J	6.8 J	5.2 J	1.6 J	3.6 J
1,1-Dichloroethane			48	120	330	340	43	150
Chloroform			5 U	10 U	20 U	20 U	5.0 U	10 U
1,2-Dichloroethane			5 U	10 U	20 U	20 U	5.0 U	10 U
1,1,1-Trichloroethane			4.5 J	4.9 J	110	39	12	55
Trichloroethene			8.3	15	4.5 J	4.9 J	19	25
Tetrachloroethene			5 U	10 U	20 U	20 U	5.0 U	10 U

MW-202

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/16/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	0.81 J	0.68 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	0.18 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	0.25 J	0.48 J	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	2	2.2	0.77 J	0.65 J	0.72 J	0.11 J	0.078 J	0.063 J
Trichloroethene	2.1	2.1	0.5 J	0.55 J	0.75 J	0.19 J	0.11 J	1.0 U
Tetrachloroethene	4.6	5.0	3.6	3.1	3.5	14	13	12

MW-203

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/15/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	0.67 J	1.5	0.13 J	0.074 J	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	0.42 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	0.28 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.19 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.82 J	1.8	4.3
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	0.92 J	2.7	0.26 J	0.14 J	0.20 J	0.66 J	0.81 J	0.76 J
Trichloroethene	1.2	2.6	0.16 J	0.17 J	0.24 J	0.81 J	0.76 J	0.84 J
Tetrachloroethene	14	15	8.6	11	13	3.5	3.2	3.1

MW-204

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 1/31/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	56	51	41	44	38	37	27	23
1,1-Dichloroethene	6.2 J	8.6 J	8.2 J	9.2 J	6.9 J	11	11	13
1,1-Dichloroethane	20 U	5.2 J	5 J	4.9 J	4.4 J	6.5 J	5.0 J	5.4 J
Chloroform	20 U	10 U	0.67 J	0.92 J	1.1 J	10 U	10 U	10 U
1,2-Dichloroethane	20 U	4.5 J	5.3 J	5.7 J	5.7 J	6.8 J	6.0 J	10 U
1,1,1-Trichloroethane	4.7 J	5.4 J	4.2 J	4.0 J	3.4 J	4.0 J	4.5 J	4.9 J
Trichloroethene	230	230	200	190	120	170	160	140
Tetrachloroethene	20 U	2.4 J	2.4 J	2.0 J	1.3 J	2.4 J	2.4 J	2.8 J

MW-205A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/7/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	25 U	25 U	50 U	20 U	25 U	20 U	20 U
cis-1,2-Dichloroethene	49	57	56	61	50	56	56	44
1,1-Dichloroethene	100	110	110	140	92	120	130	87
1,1-Dichloroethane	23	23 J	22 J	23 J	19 J	27	23	18
Chloroform	0.88 J	1.1 J	25 U	50 U	20 U	25 U	20 U	1.1 J
1,2-Dichloroethane	4.4 J	25 U	3.5 J	50 U	3.5 J	25 U	20 U	20 U
1,1,1-Trichloroethane	570	460	450	540	350	410	430	240
Trichloroethene	69	68	68	80	47	66	68	49
Tetrachloroethene	3.9 J	3.4 J	3.6 J	50 U	20 U	25 U	4.3 J	2.1 J

MW-205B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/7/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	5.0 U	25 U	25 U	20 U	20 U	20 U	20 U	20 U
cis-1,2-Dichloroethene	47	54	57	59	52	55	68	50
1,1-Dichloroethene	74	82	86	90	70	79	110	73
1,1-Dichloroethane	23	23 J	24 J	26	23	31	31	21
Chloroform	0.73 J	25 U	25 U	20 U	20 U	20 U	20 U	20 U
1,2-Dichloroethane	3.4 J	25 U	25 U	20 U	20 U	2.9 J	20 U	20 U
1,1,1-Trichloroethane	310	340	360	370	270	270	330	250
Trichloroethene	57	58	60	65	44	53	67	45
Tetrachloroethene	3.5 J	3.4 J	3.8 J	3.8 J	20 U	3.6 J	4.5 J	5.1 J

MW-206A

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/7/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	2.0 U	10 U	5 U	0.36 J	5.0 U	5.0 U	5.0 U	2.0 U
cis-1,2-Dichloroethene	23	21	20	20	21	13	20	18
1,1-Dichloroethene	22	21	14	12	14	5.9	13	9.9
1,1-Dichloroethane	8.5	9.8 J	10	9.6	9.4	12	9.7	8.8
Chloroform	0.64 J	10 U	0.55 J	0.55 J	0.72 J	5.0 U	0.66 J	0.49 J
1,2-Dichloroethane	0.75 J	10 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U
1,1,1-Trichloroethane	100	87	79	62	66	46	55	39
Trichloroethene	37	33	25	22	16	7.6	22	18
Tetrachloroethene	9.3	6.6 J	7	5.2	3.1 J	0.84 J	4.5 J	3.5

MW-206B

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/17/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	10 U	10 U	10 U	0.28 J	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	59	54	36	40	36	34	33	26
1,1-Dichloroethene	2.5 J	4.9 J	8.8 J	9.0 J	6.0	8.4	9.1	11
1,1-Dichloroethane	5.1 J	9.1 J	13	14	12	17	14	14
Chloroform	10 U	10 U	10 U	0.62 J	0.60 J	5.0 U	0.51 J	0.62 J
1,2-Dichloroethane	10 U	10 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	4.6 J	8.4 J	16	16	11	14	16	20
Trichloroethene	150	160	150	150	86	120	110	80
Tetrachloroethene	13	9.6 J	5.8 J	5.6 J	0.98 J	3.3 J	2.5 J	1.7 J

MW-206C

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/7/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	2.7	2.3	3.5	4.0	4.8	2.3	4.3	5.9
1,1-Dichloroethene	0.31 J	0.15 J	1.0 U	1.0 U	1.3	0.12 J	0.28 J	0.11 J
1,1-Dichloroethane	1.0 U	0.18 J	1.0 U	1.0 U	1.0 U	0.14 J	0.36 J	0.24 J
Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.5	0.26 J	1.0 U	1.0 U	1.0 U	0.29 J	0.7 J	0.18 J
Trichloroethene	4.1	4.3	5.3	6.0	3.5	3.4	6.6	7.6
Tetrachloroethene	0.41 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.25 J	0.2 J

MW-207

	1st Q 6/1/99	2nd Q 10/27/99	3rd Q 2/17/00	4th Q 4/18/00	5th Q 7/25/00	6th Q 11/16/00	1st SA 4/13/01	2nd SA 10/01
trans-1,2-Dichloroethene	2.0 U	1.0 U	1.0 U	0.095 J	0.16 J	1.0 U	0.44 J	0.33 J
cis-1,2-Dichloroethene	1.6 J	5.1	1.2	1.2	1.4	1.4	3.2	3.4
1,1-Dichloroethene	2.0 U	0.74 J	0.22 J	0.10 J	1.0 U	0.24 J	1.0 U	0.13 J
1,1-Dichloroethane	0.76 J	1.3	1.1	1.2	1.3	2.1	1.5	5.3
Chloroform	0.39 J	0.59 J	0.54 J	0.62 J	0.63 J	0.71 J	0.6 J	0.44 J
1,2-Dichloroethane	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	2.7	5.9	2	2.0	2	1.9	1.5	4.2
Trichloroethene	26	25	22	20	17	16	11	22
Tetrachloroethene	2.6	3.9	2.8	2.7	2.1	2.3	0.51 J	1

U: analyte not detected
B: analyte detected in blank
J: analyte value estimated
D: Dilution required

SOUTHEAST ROCKFORD SUPERFUND SITE
Summary of Groundwater Analytical Results
Sampling Event #9

Compound	Limits	MW-133A 29-Apr-02	MW-133B 29-Apr-02	MW-133C 29-Apr-02	MW-136 29-Apr-02	MW-200 22-Apr-02	MW-201 30-Apr-02	MW-202 30-Apr-02	MW-203 30-Apr-02	MW-204 17-Apr-02	MW-205A 16-Apr-02	MW-205B 16-Apr-02
Methylene Cloride	5	2.0U	50U	0.49J	2.0U	2.0U	500U	2.0U	2.0U	20U	40U	0.70J
trans-1,2,-Dichloroethene	10	1.0U	54	0.73J	1.0U	1.0U	250U	1.0U	1.0U	10U	20U	1.4J
cis-1,2-Dichloroethene	10	0.041J	460	45	1.0U	1.0U	2600	1.0U	1.0U	20	43	53
1,1-Dichloroethene	4	1.0U	25U	26	1.0U	1.0U	130J	1.0U	1.0U	18	79	59
1,1-Dichloroethane	700	1.0U	150	33	1.0U	1.0U	5500	1.0U	0.12J	6.9J	17J	22
Chloroform	0.15	1.0U	9.1J	5.4	0.45J	1.0U	5.0J	1.0U	4.1	0.77J	1.1J	0.82J
1,2-Dichloroethane	5	1.0U	3.7J	1.8J	1.0U	1.0U	250U	1.0U	1.0U	10	20U	10U
1,1,1-Trichloroethane	10	0.056J	570	120	0.30J	1.0U	1700	1.0U	0.69J	6.0J	270	220
Trichloroethene	5	1.0U	170	58	1.0U	1.0U	13J	0.12J	0.63J	140	47	48
Tetrachloroethene	5	1.0U	99	4.5J	0.53J	1.0U	250U	10	3	2.9J	6.7J	5.8J

Compound	Limits	MW-206A 16-Apr-02	MW-206B 16-Apr-02	MW-206C 16-Apr-02	MW-207 17-Apr-02	TRIP BLANK 16-Apr-02
Methylene Cloride	5	4.0U	10U	2.0U	4.0U	0.17J
trans-1,2,-Dichloroethene	10	0.39J	5.0U	1.0U	0.39JD	1.0U
cis-1,2-Dichloroethene	10	15	23	6.9	3.7D	1.0U
1,1-Dichloroethene	4	7.1	10	0.17J	0.26D	1.0U
1,1-Dichloroethane	700	7.1	12	1.0J	6.2D	1.0U
Chloroform	0.15	0.39J	0.69J	1.0U	0.36JD	0.037
1,2-Dichloroethane	5	2.0U	5.0U	1.0U	2.0U	1.0U
1,1,1-Trichloroethane	10	31	20	1.0U	5.7D	1.0U
Trichloroethene	5	16	70	14	25D	1.0U
Tetrachloroethene	5	3.4	1.5J	0.055J	1.4JD	1.0U

All results in ug/l (ppb)
Summary Report
Sampling Event #9

SOUTHEAST ROCKFORD SUPERFUND SITE
Summary of Groundwater Analytical Results
Sampling Event #10

Compound	Limits	MW-133C 16-Oct-02	MW-133(d) 16-Oct-02	MW-136 18-Oct-02	MW-200 18-Oct-02	MW-201 3-Oct-02	MW-201(d) 3-Oct-02	MW-202 17-Oct-02	MW-203 17-Oct-02	MW-204 3-Oct-02	MW-205A 7-Oct-02	MW-205B 7-Oct-02
Methylene Cloride	5	6J	7J	2U	2U	1000U	1000U	0.5J	0.5J	40U	84J	90J
trans-1,2,-Dichloroethene	10	10U	10U	1U	1U	500U	500U	1U	1U	20U	50U	50U
cis-1,2-Dichloroethene	10	51	53	1U	1U	2200	2200	1U	1U	28	85	86
1,1-Dichloroethene	4	150	180	1U	1U	480J	420J	1U	1U	140	650	470
1,1-Dichloroethane	700	49	49	1U	1U	7100	7700	1U	1U	14J	50U	50U
Chloroform	0.15	6J	7J	0.6J	1U	500U	500U	1U	1	20U	50U	50U
1,2-Dichloroethane	5	10U	10U	1U	1U	500U	500U	1U	1U	20U	50U	50U
1,1,1-Trichloroethane	10	140	150	1U	1U	970	1000	1U	1U	20U	420	310
Trichloroethene	5	66	74	1U	1U	500U	500U	1U	0.7J	170	57	46J
Tetrachloroethene	5	10U	10U	1U	1U	500U	500U	12	3	20U	30	110

Compound	Limits	MW-206A 8-Oct-02	MW-206B 8-Oct-02	MW-206C 8-Oct-02	MW-207 8-Oct-02	TRIP BLANK 15-Oct-02
Methylene Cloride	5	10U	4J	4J	0.8J	1J
trans-1,2,-Dichloroethene	10	5U	5U	5U	1U	1U
cis-1,2-Dichloroethene	10	23	31	15	5	1U
1,1-Dichloroethene	4	57	76	5U	6	1U
1,1-Dichloroethane	700	11	22	5U	8	1U
Chloroform	0.15	5U	5U	5U	1U	1U
1,2-Dichloroethane	5	5U	5U	5U	1U	1U
1,1,1-Trichloroethane	10	35	35	5U	5	1U
Trichloroethene	5	18	100	30	21	1U
Tetrachloroethene	5	3J	5U	5U	0.9J	1U

All results in ug/l (ppb)
Summary Report_final
Sampling Event #10

On page 16, the ARCADIS memorandum notes in part: "...The more highly chlorinated compounds are most susceptible to reductive dechlorination because of their higher state of oxidation... Consequently, the later steps of this process, such as degradation of cis- 1,2 DCE to VC, and degradation of VC to ethene, generally require more strongly reducing conditions in groundwater than do the initial degradation steps. Often a groundwater environment is not reducing enough... to allow for complete degradation to occur and an accumulation of daughter products is observed (such as an accumulation of cis-1,2 DCE or VC). As a result, the oxidation-reduction potential (ORP or redox) of the groundwater system is dependent on, and can influence, the specific reductive dechlorination processes..."

Remedial Design Implementation

Cooperative Agreement - In September 2002, U.S. EPA and Illinois EPA entered into a Cooperative Agreement in which Illinois EPA would take technical lead in developing remedial design necessary to execute remedial measures called for in the OU #3 ROD. Illinois EPA developed a Statement of Work indicating the overall design approach, means of generating conceptual, intermediate, prefinal, and final design packages, as necessary. A goal of the design phase is to produce a series of drawings, specifications, and other descriptions such that construction contractors or vendors of services needed for remedial action are able to generate sufficiently informed bids such that remedial action contractors can be selected with confidence. U.S. EPA helped supply funds which will be needed for design development at Areas 4 and 11, and downgradient portions near Area 9/10. The agencies anticipate funding Area 7 remedial design by drawing on the special account for Area 7 established in the 1998 Consent Decree.

Negotiations and Results Thereof Concerning Area 9/10 - Following the June 2002 issuance of the OU #3 ROD, U.S. EPA sent a combination notice letter/special notice letter to a PRP associated with Area 9/10, the Hamilton Sundstrand Corporation. On January 13, 2003, the Region 5 Superfund Division Director signed an Administrative Order on Consent (AOC) also signed by Hamilton Sundstrand, which calls for conduct of remedial design at Area 9/10 to attain ROD objectives. Hence, U.S. EPA expects that remedial design for Area 9/10 will be privately performed, with oversight from the agency. In addition to providing for strictly technical design work, which as discussed elsewhere in this document largely consists of soil vapor extraction supplemented as necessary with air sparging in the shallow groundwater regime, the AOC also has provision for recovery of approximately $ 246,000 in past costs.

V. Progress Since the Last Review

The first site five year review report prepared in 1998, primarily discussed progress concerning the municipal water supply hookups that had occurred as called for in Records of Decision

(ROD) for Operable Units #1 and #2. The first Five Year Review Report certified that the elimination of threats pertaining to groundwater exposure through such municipal hookups indicated that remedies selected in earlier Operable Units remained protective of human health and the environment.

Since the compilation of the 1998 report, there have been other significant site developments. These include:

- In 1998-1999, a groundwater monitoring well network established as provided for via a remedial action consent decree by the City of Rockford, with sampling and subsequent analytical result reports being provided to U.S. EPA and Illinois EPA on a semiannual basis. While there is a considerable way to go before all aquifer objectives can be attained, qualitatively there is some evidence of breakdown of more complex chlorinated VOCs into simpler compounds.

- In 2001, an administrative record was developed, a source control proposed plan prepared and released, several public hearings/meetings held, comments solicited and responded to. and in 2002 a ROD signed, concerning how the four leading source areas should be brought under control so as to achieve appropriate soil cleanup and a reduction in future loadings which would otherwise occur to the aquifer in the vicinity of these four locations.

- Remedial design cooperative agreements were developed between U.S. EPA and Illinois EPA regarding source area work scopes and further residential air sampling. Illinois EPA has also begun property access negotiations.

- Negotiations between U.S. EPA and a private party were successful such that an administrative order on consent was signed between the parties in early 2003 calling for private conduct of source control remedial design at one of the four source areas, Area 9/10.

VI. Five-Year Review Process

Administrative Components

At this point in time, active remedy components for the SERGWC site consist primarily of the groundwater monitoring well network as maintained and sampled by representatives of the City of Rockford, Illinois. Hence, U.S. EPA contacted technical consultant representatives as retained by Rockford in order to make logistical arrangements regarding inspection of the well network. U.S. EPA also conferred with Illinois EPA representatives regarding report content and interpretation. Looking ahead, U.S. EPA foresees that by the time the next Five Year review is required, many source control remediation units should be on-line and functioning. Hence, future composition of the review team will likely need to be more formalized, such that additional PRP and/or State-retained consultants and operating personnel are all approached concerning report development.

Community Notification and Involvement

On December 20, 2002, via local Rockford newspaper announcement, U.S. EPA informed the community (see insert) that a Five-Year Review Report compilation effort had commenced for the SERGWC site. The notice issued described important efforts made at the site in assuring supply of clean water to residents and other users, and the additional focus of contaminated soil cleanup measures and how this will help in reducing ongoing contributions to groundwater contamination. Readers of the notice were given information as to location of local site information repositories, and were provided names, mailing addresses, toll-free and direct dial phone numbers, and e-mail addresses of both Community Involvement Coordinator (CIC) and Remedial Project Manager (RPM) contacts for further information. The notice requested that interested persons relay any information of interest, comments, or site matters to either the CIC or RPM.

Document Review

Much of the document review needed comes from analytical results of the groundwater monitoring network as maintained, sampled, and analyzed by technical representatives of the City of Rockford, Illinois. A compilation of these groundwater analyses is included in this report. Other documents of interest are listed in the Reference section. These include recent decision documents, articles and literature pertaining to possible contaminant break-down products, guidance on developments related to contaminant of concern toxicity, media pathway refinement, possible means of degrading the contaminants of concern, etc.

Data Review

Groundwater data considered were provided in Section IV of this report concerning Remedial Actions.

Site Inspection

U.S. EPA made arrangement with consultants representing the City of Rockford to be present at the April 2003 groundwater monitoring well network. Further information is presented in the inspection sheets attached to this report. Future site inspection will be much more complex as other source control remedial action units come on line.

Interviews

Consultant/municipal representatives were interviewed. Interview notes are attached to this report.

They are dedicated to joining me in ending business as usual in Illinois. ❞

— **Gov.-elect Rod Blagojevich,** on the members of his top staff

yan's running mate to be art of Blagojevich's team

ociated Press

ICAGO — Democratic lect Rod Blagojevich on lay named members of his f, including former Repub- eutenant governor candi- arl Hawkinson, to lead the ior's public safety efforts. gojevich tapped Hawkin- state senator who ran with ed Republican gubernato- ndidate Jim Ryan, to serve uty chief of staff for pub- ety. His job will involve eing anti-terrorism and safety efforts.

vkinson acknowledged s appointment was unusu- use he ran on the opposite He said he discussed tak- job with Ryan, who indi- ne had no problem with nson accepting the post.

blic safety, criminal justice Republican-Democratic ' Hawkinson said. "This is nat is important. We're in ant times. There are many ges out there. I want to be the solution to those chal-

ojevich also named Alon- k as chief of staff. Monk is ney who served as Blago- s gubernatorial campaign er.

g Scofield will serve as governor in the adminis- Scofield, who served as campaign manager for nications and policy dur- campaign, previously

The Associated Press

Democratic Gov.-elect Rod Blagojevich (right) listens Thursday as former Republican lieutenant governor candidate Carl Hawkinson addresses the media after being named to lead the new governor's public safety efforts in Chicago.

Lichtenstein as general counsel. She most recently worked as senior vice president, general counsel and secretary of Tellabs Inc., a global telecommunications

Louanner Peters as deputy chief of staff for social services.

Blagojevich said his top staff will work for the good of Illinois.

"They have one interest, one interest alone, and that is that they

VII. Technical Assessment

- *Question A: Is the remedy functioning as intended by the decision documents?*

For implemented remedies, yes, one sees evidence of projected breakdown products as the contaminated groundwater moves downgradient. However, in order to provide a positive declaration that a natural attenuation remedy is functioning so as to be fully protective of human health and the environment, one needs to be able see the effects of the source control efforts. Since source control efforts are just getting into the remedial design stage, obvious impacts from subsequent soil source control remedial actions and the result this has in turn on groundwater plume of contamination loadings may not be readily discernible for several more years.

- ***Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?***

Yes, for the most part, these items remain the same. However, it is important to make note of recent developments in the area of toxicity assessment update regarding trichloroethene, or TCE. TCE is one of several site contaminants of concern, and previous site RODs have established a groundwater cleanup goal of 5 ug/l of TCE, which represents the Maximum Contaminant Level, or MCL, for TCE. The MCL for a particular compound represents the maximum permissible level of that compound for water which is delivered to a user of a public water system.

U.S. EPA's National Center of Environmental Assessment recently completed a *draft* assessment of risks posed by TCE. When completed, the updated assessment will replace the previous health risk assessment done for TCE in the 1980s. U.S. EPA has sought public comment concerning the new draft TCE health risk assessment, beginning with a September 2001 Federal Register notice.

A primary implication of the new TCE toxicity assessment is that TCE appears to pose a higher risk for susceptible populations, (such as young children/ persons with chronic diseases) than previously considered. If this implication is validated, and appears in the final version of the TCE toxicity assessment, which may be available later in 2003, there may be subsequent movement to adjust health risk screening values for TCE, and possibly to adjust the MCL once the TCE assessment is completed.

Hence, from a standpoint of risk assessment, TCE exposure goals may be adjusted downward in the future. From a standpoint of risk management, the remedial actions selected in past site

RODs (such as natural attenuation, groundwater management zone treatment procedures, and soil source management such as soil vapor extraction, low temperature thermal desorption, etc.) are unlikely to change. However, it may be possible that these techniques may need to operate for a longer period of time in the future if subsequent developments were to see a lowering of pertinent MCLs or other related environmental media goals for TCE.

- ***Question C: Has any other information come to light that could call into question the protectiveness of the remedy?***

Yes, as has been discussed in the remedial actions taken for OU #2, in 1993-1994 some 20 residences around Areas 4 and 7 had indoor air samples collected and analyzed, and that no excessive risk was demonstrated at that time.

The means of remedy selected for source control in OU #3, such as soil vapor extraction, low temperature thermal desorption of contaminated soils, etc., should have a beneficial effect upon any long term question of potential exposure to volatile contaminants entering a residential structure. However, since this Five Year Review Report should consider overall remedy protectiveness, and since there has been considerable new information, developments, and guidance appearing lately concerning the possible vapor intrusion question, it is appropriate to revisit this issue and consider actions now underway and contemplated by the Illinois EPA concerning this matter, and what information may need to be taken into account, and what *possible* remedy alteration could occur.

If a volatile hazardous substance is released into soils or groundwater, it is potentially possible that some fraction of that substance may not be fully dissolved into groundwater, not totally sorbed onto soil particles. Hence, some movement of vapors of that substance back through vadose zone soil pores could occur, with the atmosphere being the ultimate receptor or release point of vapor movement. However, there may be occasion when industrial, commercial, or residential structures might constitute a preferential pathway for vapor movement prior to atmospheric release.

In considering this pathway, in November 2002 U.S. EPA issued draft guidance entitled "Evaluating the Vapor Intrusion into Indoor Air". CERCLA NPL sites, such as SERGWC, should be cognizant of this guidance. The question of vapor intrusion into a living space presents complexities for appropriate site management. Per the bounds of the CERCLA statute and NCP, it is entirely appropriate that CERCLA efforts and expenditures be site related. However, it is probably fair to say that when it comes to the question of VOCs in the living space, numerous individual activities conducted within a building can add many detectable VOCs to the air mix, and it becomes a challenge to determine with some degree of

reasonableness which VOCs may be site-related, and therefore warrant some additional and supportable site remedial expenditure - if the degree of exposure is unsatisfactory - and which substances are not site related.

The guidance makes a clear distinction between work versus non-work related exposure. Hence, in considering the SERGWC site, and the four source areas, it is appropriate for the agencies to give greater consideration to Areas 4 and 7, which have residential populations nearby, as opposed to Areas 9/10 and 11 which are largely industrial in nature. Any undesirable level of VOCs found within structures used mainly as work locations should be handled more through the avenue of occupational exposure, which is more the domain of the Occupational Safety and Health Administration (OSHA), as opposed to an environmental question.

While the November 2002 guidance is detailed and lengthy, the writer suggests that in his opinion it might be useful to think of this guidance as a series of screens as to how one might evaluate existing information, and determine what new information may be necessary and warranted to arrive at a reasonable view of whether site-related VOCs may pose undue risk to residential/non-work areas. New considerations in the November 2002 guidance include new default parameters for usage in the Johnson-Ettinger model, an update of 1996 soil screening information, and a call for systematic tracking of advancements in sampling techniques.

There are reasons why a residence or commercial structure may constitute a preferential pathway for vapors moving through soil pore spaces. An abbreviated list might include such factors as cracks in foundation walls, usage of exhaust fans or chimneys to develop some element of "negative" pressure, intake of furnace combustion air. Seasonal variation in VOC content of a residential structure can also occur. VOCs may be higher in winter months for reasons of both furnace combustion air usage plus frozen ground and/or snow cover that might block an ordinary pathway to the atmosphere. During very rainy weather, water saturated soils may present a less attractive pathway for vapor movement than movement into a residence. Conversely, VOC concentrations in a residence may be lower during moderate weather months, when more windows are opened.

Not all cases of VOC contamination of soils or groundwater would result in any case for concern about undue VOC intrusion. Qualitatively, the deeper the groundwater table, the greater the degree of biological activity which may be naturally occurring in breaking down a given substance, the smaller the soil particle or through it carbon content the greater degree the soil may have in naturally retaining or adsorbing the VOC in question, could all significantly lessen concern over vapor intrusion.

On the other hand, the presence of relatively porous, sandy soils, a short interval from the groundwater table or primary soil contamination depth to an overlying structure, or the presence of anthropogenic objects such as utility conduits or subsurface drains, could increase the possibility vapor movement through soil spaces. And of course the quantity or amount of release of the hazardous substance would have a bearing as well.

In assessing whether the potential for an undue vapor intrusion exposure may exist, one should likely first consider existing information, degree of separation between a possible receptor and the substance source, degree of porosity provided by intervening soils, and the likelihood of utilities/drains nearby which could enhance vapor movement. If some undesirable pattern began to emerge, then one could go on to gathering soil gas information near the receptor of interest. It would be very important to involve the community at this stage as well, and to begin to discuss with residents patterns of solvent storage (e.g., in detached sheds or garages, or within the home), or other activities within the home. If "candidate" residences begin to emerge, working with the owner's permission, a next step could be further screening with flame or photo ionization devices to get a rough idea of possible intrusion of vapors into basements or crawl spaces. If such results warrant, then the environmental agencies may be in position to actually collect indoor and outdoor air samples.

If, after these various screening steps, and opportunity for exchange of information between the environmental agency and homeowner, results point to undue exposure of site related hazardous substances, then a methodology which could be brought to bear over the short term - until such time as other soil vapor extraction or other source reduction measures can properly take effect - is sub-slab depressurization. The concept of this system is to create via usage of fans, piping, very porous sumps, etc., a condition whereby the residence is no longer the "preferred path" soil vapors, but rather the ambient atmosphere would once again be the pathway of least resistance, and undue exposure to vapors avoided. In theory, it is conceivable that this step could be added to remedies already selected for attainment of OU #3 goals. However, this would only be the case should such screening and sampling of Area 4/7 residences as Illinois EPA now proposes to conduct yield evidence of undue site related VOC exposure.

VIII. Issues

Such issues were discussed in large part in Question C above. Highlights are summarized below. There are several issues which need to be followed over both the short and long term at the SERGWC site. Some of these issues have a bearing on future remedy protectiveness. For other matters, it is prudent to monitor developments in means of treatment, sampling, or analysis. Issues pertaining to remedy protectiveness include:

1. Despite many outreach attempts by the City of Rockford, Illinois EPA and U.S. EPA, between 5-10 residences elected not to hook-up to clean municipal water supplies. It may be appropriate to revisit such decisions should such unconnected properties come up for sale/change ownership in the future.

2. The agencies will observe groundwater monitoring wells at various depths in the proximity of the Rock River to help determine whether any movement of groundwater into the Rock River may be a cause for concern.

3. Early 1990s USGS work provided a reassuring observation that municipal water supply pumping in the deeper sandstone aquifer was not drawing in contaminants from the overlying dolomite (and above it the unconsolidated deposits aquifer) portions. It may be prudent to continue to make further observations on this subject to determine if this is still the case.

4. Part of the groundwater management zone remedy as selected in the 2002 OU #3 ROD was contingent on the success of source control efforts in the soil and shallow groundwater, notably at Area 9/10. U.S. EPA must consider the relative success of these other efforts.

5. While mid 1990s sampling indicated the vapor intrusion pathway was not a health problem at this site, Illinois EPA is revisiting this subject using more recent guidance materials. U.S. EPA must consider results to be developed by Illinois EPA in further addressing the matter of vapor intrusion. Will such results indicate no supplement to present remedy components is necessary, or would there be the potential to shunt possible vapor pathways in the vicinity of residential areas near source areas?

6. As remedial design efforts develop, the agencies need to look for indications of possible NAPLs presence, and if revealed, how might this matter be best managed.

Other matters of interest- These subjects may not have a direct impact on overall remedy protectiveness. Nevertheless, developments should be monitored in the following areas:

1. As source control remedial actions begin to go on line in the future, what will be the overall aquifer response, and how soon will such response be evident? Future five year review efforts may be able to discuss trends in this area.

2. Is there the possibility of future relatively passive technologies which could be brought to bear to aid aquifer cleanup with little extra expense, the adoption of which might be warranted if some future projection of aquifer cleanup timetable savings seemed desirable? One possible example of a related emerging technology is discussed further in the "follow-up action" portion below.

3. A lengthy period of time is forecast before groundwater quality of the aquifer as a whole achieves cleanup objectives. While quality control assurance sampling and analytical procedures have been determined between the City of Rockford and the reviewing agencies, will there be new, future developments in this field that would warrant the possible future modification of current quality control/laboratory procedures?

Table 2: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Small number of establishments elected not to connect to municipal water supply extensions - monitor possible property owner change for local code compliance?	N	Y
2. Does contaminant plume enter the Rock River and/or adversely affect the Rock River?	N	consider findings
3. Continued safety; deep municipal wells do not draw down plume contaminants?	N	consider findings
4. Degree of success of shallower source control measures at Area 9/10 - will it be necessary to invoke contingency measures for deeper portion of GMZ at Area 9/10?	N	consider findings
5. Monitoring results as part of revisiting the vapor intrusion pathway question - cause for concern?	N	consider findings
6. Will source control design/remediation efforts reveal presence of NAPLs, and if so, how best to manage?	N	consider findings
Other Matters/Trends to Consider:		
1. Aquifer trends/response as source control efforts go on line	(N/A)	consider developments
2. Possible future new, relatively passive/inexpensive developments that might accelerate aquifer response/recovery?	(N/A)	monitor
3. Future developments - new sampling or analytical techniques to be considered, possibly adopted in site quality control procedures?	(N/A)	consider developments
4. Future trends in municipal water supply needs; will there be a need to go deeper into the aquifer - what impact?	(N/A)	consider developments

IX. Recommendations and Follow-up Actions

Following along with items discussed in "Issues", above, these site recommendations and follow-up actions might best lend themselves to ensuring continued protectiveness:

Issue #1 - Small number of establishments that elected not to hook-up to clean municipal water supply

Recommendation - Within 60 days of signature of this Five Year Review Report, U.S. EPA will send a letter to the appropriate City of Rockford and/or Winnebago County officials reminding them of this development. Request local officials investigate the potential applicability of local code and/or zoning ordinances at times of property ownership changes in those relatively very few properties which elected not to hook-up to clean municipal water supply. Ultimate success is dependent on municipality's ability to require such change in property ownership to attain code. Oversight of progress would be via future Consent Decree related status reports.

Issue #2 - Could movement of groundwater into the Rock River be a cause for concern?

Recommendation - U.S. EPA will review the semiannual City of Rockford groundwater network monitoring reports. Once source control area efforts move into the remedial action phase, likely in about two years, U.S. EPA will supplement City monitoring reports with related monitoring information that Illinois EPA will develop through checking degree of progress for source control area groundwater management zones (GMZ). U.S. EPA will coordinate findings with Illinois EPA. Should contaminant concentrations/loadings in the vicinity of the Rock River be cause for concern, U.S. EPA would work with Illinois EPA, and as appropriate would recommend either enhanced GMZ removal efficiency, a modification to the strategy of natural attenuation of the overall plume, or both.

Issue #3 - Aquifer contaminants are not drawn down into deeper zones used as sources of municipal supply.

Recommendation - U.S. EPA will contact the City of Rockford concerning spatial and depth configuration of other municipal water supply wells. Within 60 days of signature of this Five Year Review Report, U.S. EPA will request from both the City and pertinent Region 5 Safe Drinking Water personnel what information may exist pertaining to past/ongoing intake/supply monitoring. While adverse findings are not expected in this area, should such findings be revealed, then work with the City of Rockford in exploring logical alternatives, such as adjusting pumping rates at critical points to avoid intake problems, outfitting wells with carbon filtration such as that already done at intake well MW-35, etc.

Issue #4 - Will it be necessary to invoke deeper groundwater zone contingency measures at Area 9/10?

Recommendation - Remedial design for Area 9/10 would need to be completed and put into action. U.S. EPA then suggests that a reasonable time, such as about 2-3 years of active operation, would be a suitable period to see if contaminant loadings are being reduced sufficiently through actions in soil and shallower groundwater zones.

Issue #5 - While the vapor intrusion pathway was not shown to be of concern during development of OU #2 risk assessment documents, what will upcoming vapor intrusion pathway sampling reveal?

Recommendation - Work with Illinois EPA in considering possible additions to what is known about the question of vapor intrusion around certain residential zones near source areas such as Area 4 and Area 7. Should any further supplemental remedial action be warranted based on such additional information, take appropriate action based on the facts of the matter.

Issue #6 - Could NAPLs pose a problem which currently selected remedies do not address?

Recommendation - Consider new information that may be revealed by future source control remedial design and/or remedial action measures concerning NAPLs presence, and if so, what management techniques might be most prudent to adopt.

Other Matters

1. Consider how the overall site aquifer is observed to respond once source area remedial actions are begun. Consider what computer software or other aids may help in compiling, assessing, and noting trends to be gathered from future data reports.

2. Consider new research and continuing developments that could periodically call into question not necessarily the protectiveness of original remedies selected, but the advisability of continuing such remedy without alteration. For example, the November 4, 2002, issue of Chemical & Engineering News magazine contained an article on page 8 about research work on a *Dehalobacter* strain of bacterium called TCA1 that through enzyme production reduces 1,1,1-trichloroethane - which is the leading contaminant of concern at the SERGWC site. While tests are at the lab stage, it would be prudent to monitor further developments in case some significant breakthrough might occur, whereby soil and/or groundwater concentrations of 1,1,1-trichloroethane might be economically managed through in-situ introduction of this bacterium. Should the need arise, additional work provisions of existing enforcement documents could be used by one party to inform the other of possible pertinent breakthroughs in areas such as this.

3. U.S. EPA will consider future developments in the field of quality control assurance sampling and analytical procedures. Since monitoring may need to be conducted over many years, it is possible that currently agreed upon quality assurance and field sampling techniques may benefit from future modification. Should the need arise, either U.S. EPA or the City of Rockford could bring such matter to the other's attention via consent decree additional work provisions.

X. Protectiveness Statement

The remedy implemented at OU #1 and OU #2 is protective of Human Health and the Environment, all immediate health threats have been addressed, and there are no exposures of concern. For Operable Units 1 and 2, which dealt with both extension of clean municipal water supply, and the opportunity to hook-up residences and businesses that previously may have been using a contaminated private water source, and with developing a remedy to attain eventual aquifer cleanup, remedial actions either have been taken or are on-going. The remedy is protective given completion of a portion of the remedy (i.e., hook-up of several hundred users to a clean, alternative water supply), and appears to be protective of human health and the environment for that portion of the remedy for which remedial action is underway. That is, for the process of aquifer cleansing through natural attenuation, monitoring results indicate the presence of more complex contaminant breakdown, or intermediate, products.

For Operable Unit 3, the remedy is expected to be protective upon completion. For the more concentrated source areas for which soil cleansing and/or groundwater management zone action is needed, action stands at the remedial design process. The technologies selected for Operable Unit 3 appear to be protective of human health and the environment since they largely represent technologies which constitute presumptive remedies in dealing with volatile organic contaminants in soils and groundwater. Once design is complete, and the remedial technologies are installed and operating, a following review report can deal more definitively with the degree of success of the source control efforts.

XI. Next Review

The next Five Year Review will be completed within five years of signature of this report, which would be by approximately May 2008.

REFERENCE MATERIALS

1. "Geohydrology and Ground-Water Quality in the Vicinity of a Ground-Water Contamination Site in Rockford, Illinois" U.S. Geological Survey Water Resources Investigations Report 93-4187. 1994

2. Record of Decision - Groundwater Response Action - Southeast Rockford Groundwater Contamination Site - Rockford, Illinois September 1995

3. Record of Decision - Southeast Rockford Groundwater Contamination Superfund Site, Rockford, Illinois - June 2002

4. Technical Memorandum - Review of Natural Attenuation Processes in Groundwater. November 1999 ARCADIS Geraghty & Miller for ITW, Inc.

5. Final Remedial Investigative Report for the Southeast Rockford Source Control Operable Unit July 25, 2000 by Camp Dresser & McKee for Illinois Environmental Protection Agency

6. (Various) Quarterly or Semiannual Groundwater Monitoring Results - Southeast Rockford Groundwater Contamination Site - 1998 to the present - as submitted by Nationwide Environmental Services, Inc., on behalf of the City of Rockford, Illinois

7. U.S. EPA - Supplemental Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway - Various drafts 1999 to 2002

8. Various Dioxin Articles from Dioxin Homepage - http://www.enviroweb.org/issues/dioxin/

(Considered by the agencies at the time of OU #3 record development regarding possible concerns and needed emission controls for source control systems that may employ elevated temperatures)

9. Draft TCE Toxicity Assessment Fact Sheet of 11/18/2002

10. Article available from Enviroequip entitled "Groundwater Sampling with Low-Flow Procedures: The Whats? The Whys? The Hows?"
(Note - Mention of a particular manufacturer in this report does not necessarily imply U.S. EPA endorsement, but rather is used for illustration of a given groundwater sampling technique.)

INTERVIEW RECORD

Site Name: Southeast Rockford Groundwater Contamination Site

EPA ID No.: ILD981000417

Subject: Monitoring Well Network Security; UW-35 GAC Usage

Time: 1:15 P.M. **Date:** November 7, 2002
Type: XX Telephone ☐ Visit XX Other (fax followup)
Location of Visit: ☐ Incoming ☐ Outgoing

Contact Made By:

Name: Russell D. Hart Title: RPM Organization: U.S. EPA - Region 5 - Superfund

Individuals Contacted:

Name: Wallace Parsons Title: Acting Water Utility Superintendent Organization: City of Rockford
Telephone No: (815) 987-5714
Fax No: (815) 961-3792
Street Address: 1111 Cedar Street
City, State, Zip: Rockford, Illinois 61104

Summary Of Conversation

November 7, 2002

Mr. Wallace Parsons
City of Rockford Water Utility Superintendent

Dear Mr. Parsons:

Thank you for talking with me earlier this afternoon. I understand you have now assumed the duties of Mr. Robert Nimmo, who retired recently.

As I noted, every five years U.S. EPA must develop a "Five Year Review Report" for the various Superfund sites at which remedial actions are underway to examine if the remedy still appears to be"protective of human health and the environment". As you know, we receive the semi-annual groundwater monitoring reports as compiled by the City of Rockford and its consultant, National Environmental Services, Inc., with regard to conditions at the Southeast Rockford Groundwater Contamination site. For the Southeast Rockford site, we need to compile such a report sometime by the spring of 2003.

In addition to examining the values relayed in those reports, and looking for any trends in the data, we should - as we compile the Five Year report - be able to comment on "nuts and bolts" logistical items that could have a bearing on the remedy's protectiveness. For the Southeast Rockford site situation, that would be such items as:

- do the monitoring wells seem secure; that is are the caps locked in between sampling events - are the wells readily identifiable per some logical marking or recording system?

- in Mr. Nimmo's letter of January 3, 2002 to U.S. EPA, as he provided a status update, it was indicated that the City of Rockford was about to enter a contract with Calgon Carbon Corporation for replacement of up to 100,000 pounds of granular activated carbon for Municipal Well # 35, and that this much GAC would likely provide up to six years of service at UW-35 given expected pumping rates. Was this contract finalized, and has the carbon replacement work begun or been accomplished?

Finally, since the Five Year report must involve a field visit to the site as it is being compiled, I would appreciate it if either yourself or a member of National Environmental could contact me a few days ahead of when you might expect the next groundwater monitoring network sampling event to take place, so that I could go along for a portion of the sample collection effort.

Thank you for your assistance.

Russell D. Hart - Remedial Project Manager
phone (312) 886-4844 Fax (312) 886-4071 or (312) 353-5541
e-mail: hart.russell@epa.gov

cc: Mr. Mark A. Leslie - Nationwide Environmental Services, Inc.

INTERVIEW RECORD

Site Name: Southeast Rockford Groundwater Contamination Site

EPA ID No.: ILD981000417

Subject: UW-35 GAC Usage

Time: Approx. 11:40 a.m. **Date:** April 23, 2003
Type: ☐ Telephone XX Visit ☐ Other

Location of Visit: At the pumphouse and water treatment facility for Rockford Utility Water Division Municipal Supply Well # 35. This location is of importance because monitoring revealed slight VOC contamination of raw water at this point, and therefore the well has been outfitted with activated carbon.

Contact Made By:

Name: Russell D. Hart Title: RPM Organization: U.S. EPA - Region 5 - Superfund

Individuals Contacted:

Name: Wallace Parsons Title: Acting Water Utility Superintendent Organization: City of Rockford
Telephone No: (815) 987-5714 Fax No.: (815) 961-3792
Street Address: 1111 Cedar Street
City, State, Zip: Rockford, Illinois 61104

Name: Nadine Miller Title: Water Quality Supervisor Organization: City of Rockford
Telephone No.: (815) 987-5713 Fax No.: (815) 961-3792
Street Address: 1111 Cedar Street
City, State, Zip: Rockford, Illinois 61104

Summary Of Visit/Conversation

During the time period April 22-24, 2003, the RPM was engaged in a field visit to portions of the Southeast Rockford Groundwater Contamination site for which active remedy components were functioning. This mainly involved the groundwater well monitoring network, and also the activated carbon treatment system which serves municipal water supply intake well # 35. On April 23, beginning at about 11:40 a.m., Mr. Parsons and Ms. Miller of the City of Rockford provided the RPM with a tour of the UW-35 pump house and treatment facility.

Five Calgon Model 10 activated carbon filled tanks serve UW-35. Each tank holds up to 20,000 pounds of activated carbon. It was explained that the City of Rockford maintains some 39 municipal groundwater supply wells, distributed over an area of about 57 square miles. Three wells within the system are equipped with carbon filtration units, although only UW-35 is associated with the Southeast Rockford Groundwater Contamination site.

UW-35 was said to be used most frequently in the summer months when water demand is higher. It gets occasional usage during cold weather months, with backflushing of the carbon tanks occurring 1-2/month during periods of less frequent usage. The City monitors raw/finished water supply for VOC content to ensure the finished supply is free of VOCs associated with the site.

The last major changeout of the carbon supply was done in 1996-1997. Systems and service arrangements vary; some systems attempt a certain amount of carbon recovery through heating spent carbon and driving off captured contaminants. Others simply get a new supply of virgin activated carbon. The system serving UW-35 falls into this latter category. Rockford officials noted that they certainly check for signs of breakthrough into the finished water. Given current water demand rates at UW-35, Rockford officials estimated it would likely be another 2-3 years before a major activated carbon changeout is needed.

At this pumphouse/treatment location, located just east of Bildahl Strret and north of Brooke Road, chlorine and fluoride treatment is also given to the water. Operator logs are kept on site concerning pumping and dosage rates. Other site reference materials have noted that this unit serves as a "pump and treat" point within the contaminated aquifer, although only a few tenths of a percent of total plume loading might pass through this point.

Site Inspection Checklist

I. SITE INFORMATION

Site name: Southeast Rockford Groundwater Contamination Site

Date(s) of Inspection: April 22-24, 2003

Location and Region: Rockford, IL - Region 5 **EPA ID:** ILD981000417

Agency, office, or company leading the five-year review: U.S. EPA - 5

Weather/Temperature: April 22 - Mostly Sunny; temperatures rising during the day to the low 50s
April 23 - Sunny; temperatures rising during the day to about 60
April 24 - Cloudy; temperatures rising during the day to the high 40s

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- XXAccess controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other_____
- XXMonitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

There are two primary elements at the Southeast Rockford Groundwater Contamination Site which could be construed as currently operating remedial action components. These consist of the activated carbon treatment system used at municipal groundwater intake well UW-35, and the sampling/analysis of the groundwater monitoring network which is undertaken by the City of Rockford to chart progress toward aquifer cleanup goals. Remarks concerning the visit made to the activated carbon treatment system on April 23, 2003, were presented above in the "Interview Record" section of this report.

The balance of the April 22-24, 2003 site inspection concerns the groundwater monitoring network. Per the terms of a Consent Decree entered by the City of Rockford, U.S. EPA, and Illinois EPA, semi-annual sampling of the groundwater monitoring network is to be performed by the City of Rockford, with results forwarded to the agencies. The site inspection was timed to coincide with the spring 2003 well network sampling event. For data presentation and reporting, the City of Rockford has retained Nationwide Environmental Services, Inc., to assist in such effort. In turn, Nationwide has subcontracted with Anderson & Egan, Co., to collect the groundwater samples and arrange for appropriate sample labeling, chain of custody procedure to the analytical laboratory, etc.

Approximately 36 wells comprise the groundwater monitoring well network at the Southeast Rockford Groundwater Contamination Site. It may be appropriate at this stage to briefly discuss the overall approach to sampling as undertaken by the City of Rockford and its consultants. In the "classic" means of groundwater sampling, a volume of water of from 3-5 times the casing volume is pumped out of the monitoring well in order to obtain a "representative" sample. For a large monitoring network, such as that maintained by the City of Rockford for this site, a sampling event can then involve the investment of considerable time, plus create a significant waste disposal problem due to the large volumes of water that are purged before actual sample collection.

Therefore, a couple of years ago the City of Rockford, working with its consultants, explored and then made a decision to invest in low-flow groundwater sampling procedures. In low-flow procedures, a dedicated pump is installed at the desired depth down the well casing at the appropriate well screen position. This pump, which may then be operated through use of compressed gas/air stored or generated in the sampling vehicle, runs at low withdrawal rates of around 200-250 ml/minute, and only draws in groundwater from the very nearby depth of concern. The mass of stagnant water above the depth of interest need not then be pulled in or purged. By checking field probe readouts of such parameters as pH, conductivity, turbidity, etc., - which may be displayed on a portable computer screen readout - one can then see when a "steady-state" condition occurs, and collect the sample at such time.

Using such methodology, most wells can be sampled in 20-30 minutes. Based on earlier experiences, Anderson & Egan representatives noted that even relatively shallow wells took 90 minutes to sample. Also, in earlier sampling situations, Anderson & Egan had to pull around a 250 gallon tank to store excess purge water. Now, a 2-3 gallon plastic bucket suffices.

Groundwater Monitoring Records XX Readily available XX Up to date ☐ N/A

Remarks U.S. EPA is sent reports which summarize results of the semiannual groundwater monitoring efforts. While U.S. EPA does not routinely request such information with the semiannual analytical reports, field parameter conditions are kept in storage on the "Micropurge" hand-held unit.

Daily Access/Security Logs XX Readily available XX Up to date ☐ N/A

This category may apply more appropriately to records kept directly by Rockford operators at UW-35. The April 2003 site visit showed that daily pumping and dosage records are maintained by the City for raw and finished water supply information, e.g., chlorine/fluoride usage, etc.

ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

Fencing

1. **Fencing** ☐ Location shown on site map XXGates secured ☐ N/A

The pumphouse_at UW-35, as well as the activated carbon treatment units, sources of chlorine, fluoride, etc., were all kept in a securely locked treatment building. The premises had perimeter fencing which was also locked at a gate entrance point.

Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks__ Most of the flush-mount style of groundwater monitoring wells had stamped-on printing to indicate to the public that the device was for groundwater monitoring.

General

1. **Vandalism/trespassing** ☐ Location shown on site map XX No vandalism evident
Remarks__The great majority of monitoring well locations were in good physical condition.

Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

XX Properly secured/locked XX Functioning XX Routinely sampled XX Good condition
XX All required wells located Needs Maintenance ☐ N/A

Remarks__ From the April 2003 site inspection, it would appear that about half of all site groundwater monitoring wells are of the "stick up" type. All such wells had a lock. In talking with Anderson & Egan representatives, at one time, there were different keys for different locks. However, now all locks use the same master key. In discussing security arrangements with the City of Rockford, it was felt that a very small number of keys would lead to only a very small number of persons who might have a need for such a key. Nearly all flush mount wells were secured with bolts that required a tire iron for access. A few older flush mount types, such as MW-47, needed a unique rounded key. Other low profile wells needed a socket wrench. The normal means of well identification was for markings to appear on the inside of the casing or tubing connection, i.e., out of the weather so that there was less chance marking would fade. During the April 2003 inspection only one well - MW-16 - did not have obvious markings inside or out. Anderson & Egan noted that at one time there had been an outer plate on this well on which the markings had been etched. However, these were largely worn away. Mr. Egan marked the inside casing with appropriate identification using indelible marker, much as had been done for the other wells.

Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

At this stage, implementation of the remedy has been effective and is functioning as designed. Operable units #1/#2 had as their goal the elimination of drinking water as a pathway of concern, plus the setting of long-term aquifer cleanup goals. Numerous connections to a clean municipal drinking water supply have occurred. The groundwater monitoring network has been established and is being sampled and analyzed in accordance with Consent Decree provisions. There is a functioning activated carbon filtration system on a groundwater intake supply well (UW-35) which is affected by the plume of contamination.

Source control measures as envisioned by Operable Unit #3 are now in the remedial design stage. As these source control measures progress through the construction stage, pollutant mass should be removed from the vadose zone plus shallower zones of the contaminated aquifer. Future reports such as this may start to see more progress toward overall cleanup goals.